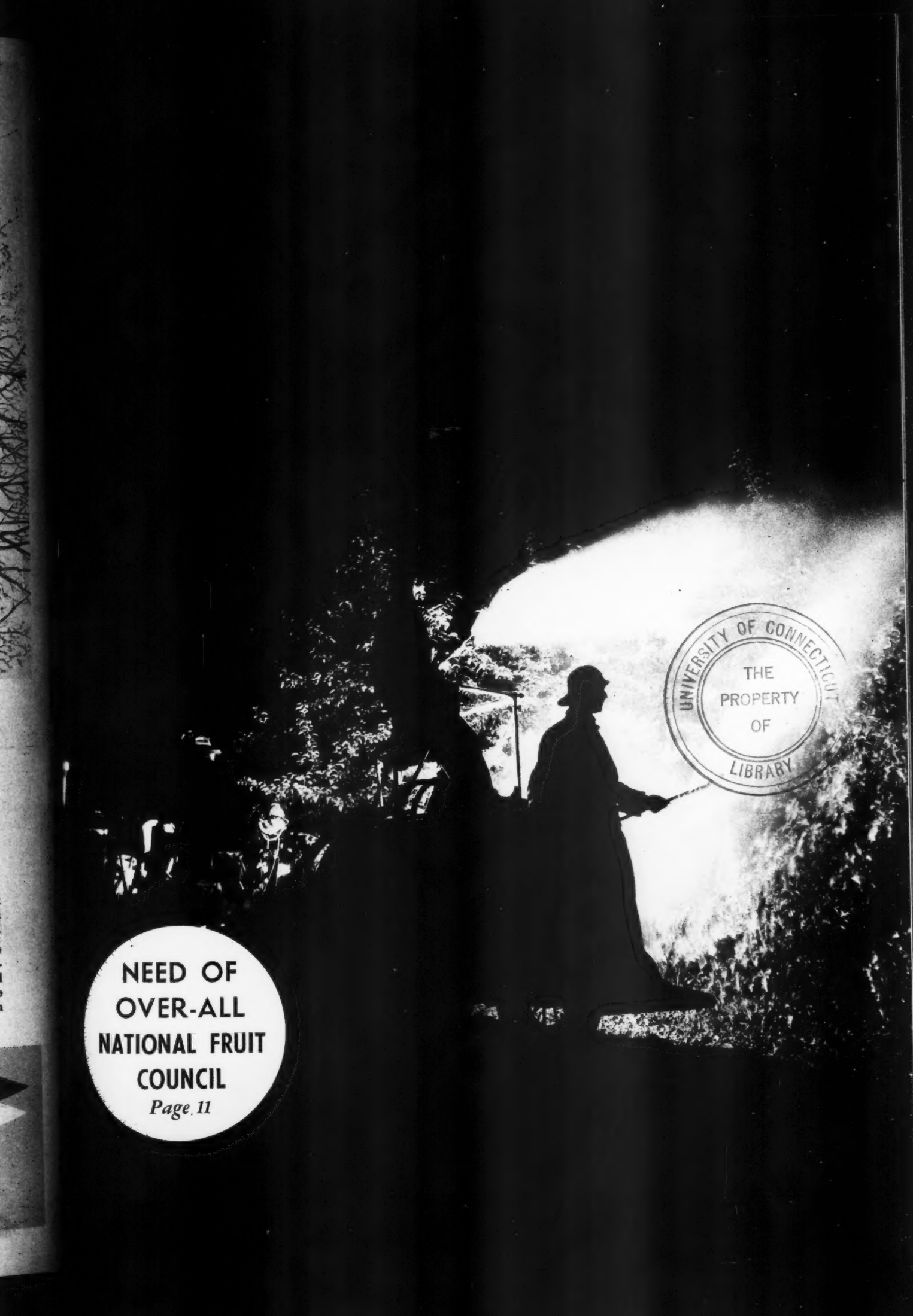

NEED OF OVER-ALL NATIONAL FRUIT COUNCIL

Page 11

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Get BETTER CLEANING AT No Extra Cost

and **YOU WILL GET EXTRA TRACTION PLUS LONGER LIFE *and* EXTRA QUALITY TOO!**

TO GET the greatest pull out of a tractor tire, traction bars must be clean so they can dig in and take hold. That's just one more reason why Firestone Ground Grip Tires outpull them all. The tread is *self-cleaning;* bars are tapered and placed at the *exact* angle that automatically works out all mud and trash. It cleans as it pulls:

And there are other reasons why you get more traction:

★ **The Firestone Ground Grip Tire is the *only* tractor tire with triple-braced traction bars. All tread units are solidly joined—no broken bars to cause traction leaks, slipping and spinning.**

★ **The Firestone Ground Grip Tire is the *only* tractor tire with a patented tread design—the *only* tractor tire having up to 215 extra inches of tractor bar length per tractor.**

See your nearby Firestone Dealer or Firestone Store today and get the tires that give you most for your money — they cost no more than ordinary tires.

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BEST IN RUBBER

Mr. Extra Traction represents the Extra Bar Length that gives Superior Pulling Power to FIRESTONE GROUND GRIP TRACTOR TIRES

FIRESTONE BUILT THE *FIRST* PRACTICAL PNEUMATIC TRACTOR TIRE AND PUT THE FARM ON RUBBER

WE'VE GROWN YOUR CROPS HUNDREDS OF TIMES

. . . to give you better sprays and dusts

Not in hundreds of different *years,* of course . . . but in hundreds of different sets of growing conditions. For while your particular orchards are affected only by the temperature, humidity, insects and diseases prevalent in your locality, tests supervised by Du Pont scientists are scattered countrywide. Thus we compress into a single season an amount of experimental work that would ordinarily require many years.

To help fruit growers, Du Pont researchers are continually working to *improve* old products and develop *new* ones. One new product that has resulted from this effort is "Fermate," a most promising fungicide. Tests show "Fermate" to be highly effective in low concentrations against a wide variety of troublesome fungi, safe to use on most plants, and compatible with Lead Arsenate and summer oil sprays. "Fermate" is now available only in limited quantities for evaluation purposes.

But there are many Du Pont Spray and Dust Products available now in adequate supply for essential needs—Lead Arsenate, synthetic Cryolite, "Sulforon" wettable sulfur and others. Keep in touch with your Du Pont dealer. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington 98, Delaware. Write for your copy of the new "Spraying & Dusting Schedule."

HAVE YOU SEEN
"SOLDIERS OF THE SOIL"?
In this interesting sound movie, Du Pont is telling the world *your* story . . . the role of America's food producers in wartime. Free bookings now being arranged for farm groups nationwide. Write for illustrated folder. 2504 Nemours Building, Wilmington 98, Delaware.

FOR EFFECTIVE CROP PROTECTION
DU PONT INSECTICIDES *and* FUNGICIDES

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

MOST OF IT WILL LAST YEARS YET

Many parts of the Hardie Sprayer are practically indestructible. Those parts most affected by wear are quickly available and easily replaced.

● Perhaps a new pump will make a new sprayer out of that old Hardie. Perhaps some new engine parts are needed. Perhaps one of the new, improved Hardie guns will give the old sprayer a better chance to make good on the job. You can readily get new pumps, tanks, agitators, guns, hose—all needed parts and materials for service. Complete new Hardies are available under new larger quotas. Ask any Hardie dealer. Write for the new 1944 Hardie catalog.

THE HARDIE MFG. COMPANY

Hudson, Michigan

Portland, Oregon **Los Angeles, Calif.**

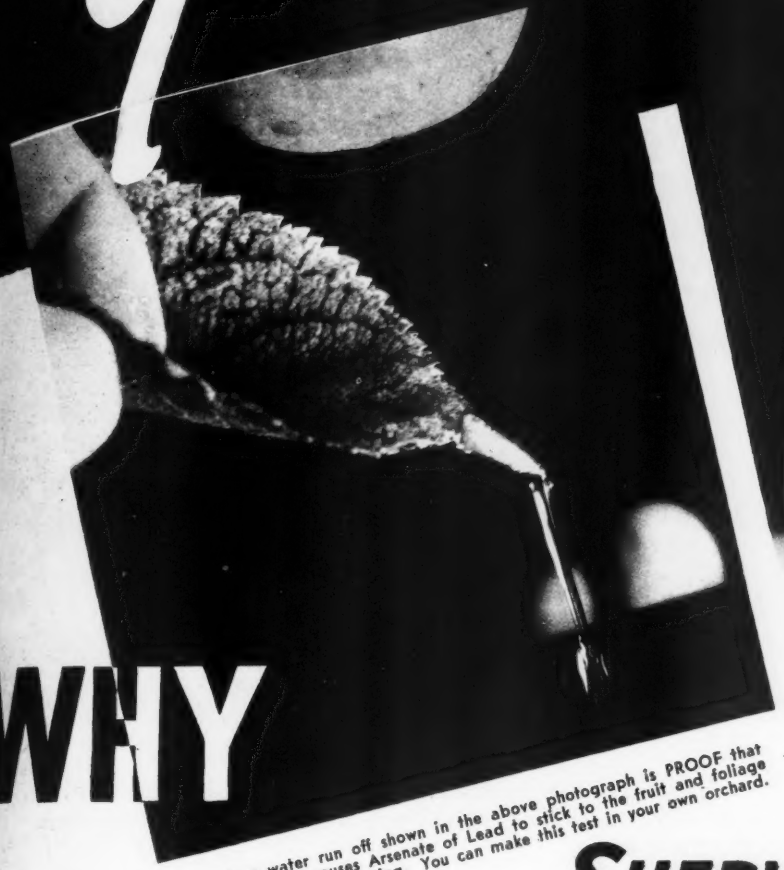
HARDIE

. . . THE ONLY SPRAYER THAT IS COMPLETELY LUBRICATED

DEPENDABLE SPRAYERS

Vol. 64, No. 2, AMERICAN FRUIT GROWER, published monthly by American Fruit Grower Publishing Co., 1370 Ontario St., Cleveland 13, Ohio. Subscription rates: Domestic, except Cleveland, 3 years $1.00. One year, 50 cents. Cleveland, Canada and foreign, $1.00 per year. Single copy, 10 cents. Entered as second-class matter at Post Office at Cleveland, under the Act of March 3, 1879. Additional entry at Mount Morris, Illinois. Printed in U. S. A.

See for Yourself



The clear water run off shown in the above photograph is PROOF that S-W Spralastic causes Arsenate of Lead to stick to the fruit and foliage in a heavy uniform coating. You can make this test in your own orchard.

Cloudy run off shown in above photograph occurs when lime is used with Arsenate of Lead, carrying off a heavy percentage of Arsenate of Lead, leaving the deposit reduced and spotty. You can also prove this in your own orchard.

WHY SHERWIN-WILLIAMS

ARSENATE of LEAD and SPRALASTIC

are a Winning Combination for Codling Moth Control

The above photographs demonstrate how you can conserve Arsenate of Lead, and at the same time obtain the heaviest deposit for control of codling moth,—by the use of Sherwin-Williams Arsenate of Lead combined with S-W Spralastic, the most efficient spreader and sticker ever developed.

Sherwin-Williams Arsenate of Lead tests 98% active ingredients, which is 2% higher in content than some other Arsenates of Lead. It also has a low water soluble arsenic content. These superior chemical properties, plus the extreme physical fineness of S-W Arsenate of Lead, give maximum control of codling moth.

To give your Arsenate of Lead still greater efficiency use S-W Spralastic. Its use actually causes three to four times more Arsenate of Lead to remain on the fruit. Spralastic does this by increasing the adhesive and spreading properties of the Arsenate of Lead particles and eliminating wasteful run off. Study the photograph shown above, upper left. The use of Spralastic results in a uniform, heavy coating of Arsenate of Lead on apples, yet one that is easily removed in the standard washing process.

Safe-N-Lead Prevents Arsenical Injury

For complete protection of apple foliage throughout the growing season use Safe-N-Lead. Added to Arsenate of Lead in the spray tank, Safe-N-Lead converts the water soluble arsenic into a stable compound which will not "burn" apple foliage, but instead stimulates the growth of healthy, green leaves.

Hydrated Lime does not prevent arsenical burn, is detrimental to apple foliage, and its use reduces the effectiveness of Arsenate of Lead.

BE FOREHANDED ORDER EARLY

SEND FOR FREE FOLDERS which will give you the whole story of the effectiveness of these Sherwin-Williams products for maximum control of codling moth with wartime conservation of spray materials. Address Insecticide Dept., The Sherwin-Williams Co., 101 Prospect Ave., Cleveland, Ohio.

Men can't fight without— FOOD!

The fighters who storm the beaches count on you for the food to keep them going.

When you aim your BEAN Sprayer at the pests in your orchard, you aim it at the enemies our boys face overseas.

Amphibian Tanks, built by Food Machinery Corporation, are making history in this amphibious war.

Good Service for BEAN *Owners Everywhere . . .*

Authorized BEAN dealers are ready in every growing section with BEAN Parts and BEAN Service to help you keep your BEAN rolling for Victory.

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It takes food to keep fighting men victoriously in the fight. Good food. Plenty of food. Food that only the home front can provide.

That's where your BEAN Sprayer comes in. For a thorough spray program is of first importance when it comes to producing the *most* and the *best.* And it takes a sprayer like the BEAN to give you the power...speed...capacity ...and absolutely dependable operation demanded by a wartime spray schedule.

In a sprayer it's the pump that counts. The big rugged slow-moving high-pressure BEAN Royal Pump has no equal. The high pressure and sturdy construction so important in peacetime are doubly valuable now with goals for wartime food production set at an all-time high. BEAN is the oldest spray pump manufacturer in the world, and there is no substitute for experience.

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BEAN ★★★★★★ SPRAYERS

KEEP 'EM ROLLING FOR VICTORY PRODUCTION

AMERICAN FRUIT GROWER

E. G. K. MEISTER, *Publisher*

THE NEW MYSTERY INSECTICIDE

OUT of the war has come a new and powerful insecticide. It is being kept a military secret, and for the duration the total output of this powder is being bought by the Army to protect soldiers against typhus. In peace times it will, perhaps, revolutionize the control of insect pests in fruit growing.

Although the secret weapon is new, the chemical which gives it such potency in the control of a long list of insects was first synthesized 70 years ago by a German chemist. It was not until 1939, however, that its use as an insecticide was patented by a Swiss firm, Geigy, Inc.

The chemical used in this powerful insecticide is dichloro-dephenyl-tri-chloroethane. DDT, is the chemical abbreviation which has been adopted in the United States and Great Britain. Another abbreviation for the compound which is used by the Geigy Company, who produce it abroad and in this country, is GNB-A. GNB is a combination of Gesarol Neocide Base. When the letter A is added it indicates that the compound was produced in the United States.

DDT or Gesarol is reported to be extremely and instantaneously toxic to many insects. When used in powdered form, however, it may be dusted on human skin without harm, except to any insects that may be around.

The Army, at the present time prefers to keep the full possibilities of this compound a secret. Its potentialities for use as an insecticide in the fruit and agricultural fields, when peace comes, are so amazingly great, however, that already DDT is the chief subject for discussion whenever and wherever scientists, fruit growers and farm leaders meet.

The compound was known almost entirely as a repellent for moths and plant lice, until last May when the U.S.D.A. announced that it had thoroughly tested its safe use on the human body, as well as its deadliness when used against the codling moth worm, the Colorado potato beetle, the cotton ball worm, citrus pests and scores of other insects, including flies, mosquitoes, roaches, bedbugs and body lice.

At this point, because DDT was found not to be dangerous to human beings when dusted on the skin, the Army stepped in and commandeered the entire output of the product in this country.

The Army is using DDT chiefly to rid soldiers of body lice and to ward against those creatures, which are carriers of the typhus fever known in Europe. American typhus is spread by the fleas that live on the bodies of rats until they have opportunity to migrate to a human skin. Some conception of DDT's potency may be had from the fact that a single application dusted on clothing gives protection from disease-carrying vermin for one month.

This, of course, is not the first insecticide that kills by contact, but entomologists say it is the swiftest acting. Its effect on flies is a typical example of its deadly effectiveness. Flies would be poisoned by DDT if they ate it. They can't have time to eat, because the moment they touch it they curl up and soon are dead of the paralysis that begins in their feet and spreads quickly through their bodies.

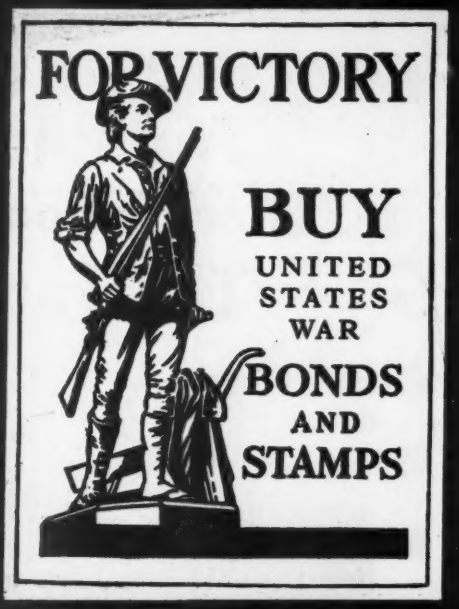
In tests, one application of the powder to the walls of a room made the room a death chamber for flies for three months. The flies did not even have to touch the walls. They died even if they touched the body of one that had been there before they arrived.

One of the outstanding properties of this compound is stability. When DDT is sprayed on screens and mosquito netting, its effectiveness remains for many weeks.

A difficult compound to make, DDT is such an effective insecticide that the Army recently flew the first 500-pound cargo produced at a Du Pont pilot plant to an overseas front. Tonnage manufacture at the new half-million dollar plant to be built by Du Pont at government request will be entirely devoted to Army and Navy use. The Du Pont Company's Grasselli Chemicals Department is licensed by the Geigy Company for the sale and manufacture of this synthetic insecticide.

Since several American companies are working on the production of this insecticide under various trade names, it is quite probable that it will not be too long before production will exceed Army and Navy requirements and quantities may be released for wider experimentation in fruit and agricultural insect pest control.

Looking ahead then, one can foresee a new era of insect control in the orchards of America, if the possibilities of this war-born product are fulfilled in times of peace.



NATIONWIDE NEWS

THE War Food Administration repeats its warning to growers and shippers of fruits and vegetables that new wooden containers will be scarce in 1944. Growers and handlers of these commodities are asked to make the greatest possible use of used containers of all types — including wood crates and boxes, and open-mesh bags.

Retailers and the buying public have been inclined to discriminate against used containers, but the War Food Administration now asks them to accept produce on its merits, irrespective of whether it is delivered in new or second hand packaging materials. Used containers, WFA officials explain, should be regarded as necessary "wartime packages," comparable with a recapped rubber tire. The shortage of new containers is such that many fruits, and other food items in 1944 will either be delivered in used containers or not at all.

Officials of the War Food Administration and the War Production Board say that if yields are normal, wooden container materials will be short of the demand by 10 to 20 per cent.

★

U. S. Civilian supply of canned apples for the manufacture of apple pies and similar products is to be increased by the release of 8½ million pounds from Government-owned stocks, says the War Food Administration. Approximately 230,000 cases of apples, packed in No. 10 size cans, are being offered for sale to the canners who originally packed them for the Government.

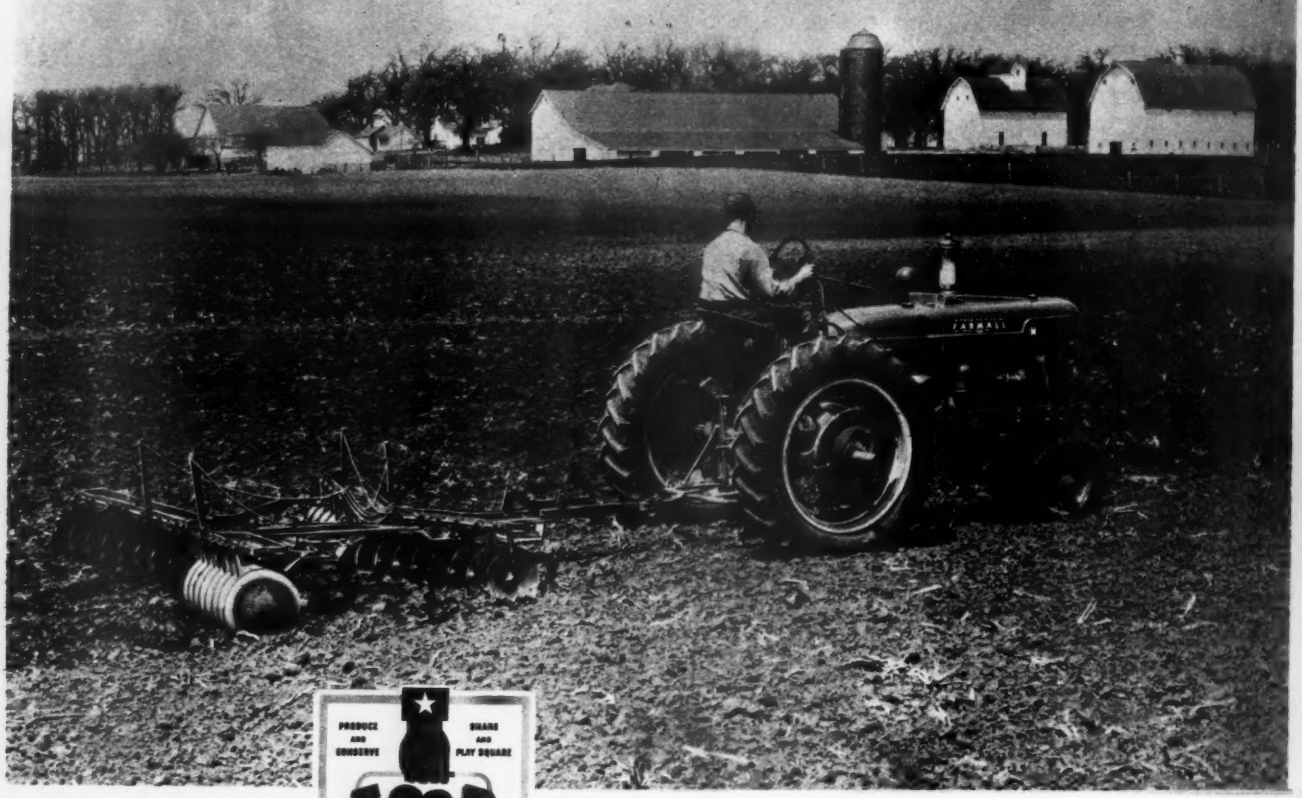
Cover illustration—night spraying in a New Hampshire orchard.

FARMALL and HARVESTER

ARE PLEDGED TO SERVE

The Family Farm

...and so are the International Harvester Dealers as they celebrate
FARMALL'S 20TH BIRTHDAY



THE FAMILY FARM ...AND THE FARMALL FIGHTS FOR FOOD!

THE FAMILY FARM is *Home Sweet Home.* It is home ground where every corner in the house, every turn in the lanes, every rise and fall in the fields, is part of the family's heart and soul..

The writer of this Harvester message grew up on the farm. His mother is nearly 80 and she has left the farm for a cottage in town, but her heart refused to come along. The farm is her home, and will be. Her youngest son is operating the homestead now. He is running it alone—with his Farmall tractor. In September he filled his silo, alone—a tough job, but he did it. In the house is Gladys, his wife, and the little daughter, Janet. There will be a new baby in February. "Maybe it will be a boy," they are saying.

Isn't the story much the same on a million farms today? Maybe it is like that on *your* farm.

Everywhere you go, FARMALL Power and hydraulic control of implements makes all the difference. The true all-purpose tractor, that can do so much for a man, is a blessing in times like these. Food is fighting for Freedom—and the Farmalls, with their many mounted, pull-behind and belt machines, are fighting for food.

This Is Farmall's 20th Year—the tractor that *started from the implement end*—the power that is dedicated to the prosperity of the family farm. When the boys come home, the FARMALL SYSTEM will lead the way to the Future!

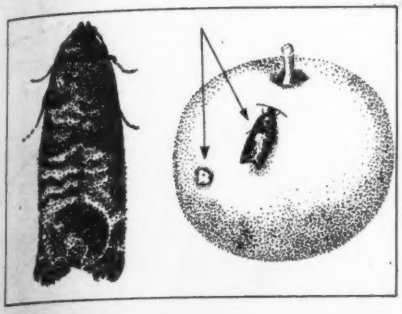
★ ★

When war struck our Nation, a Farmall army, with an infinite number of working tools, went into battle. The food crisis was at every farm gate—and the FARMALL SYSTEM was ready.

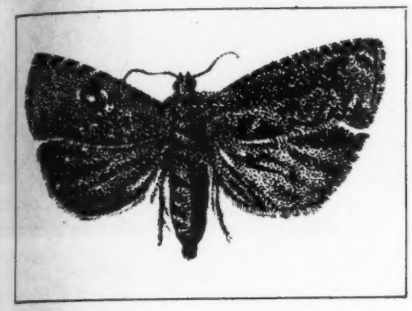
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue, Chicago 1, Illinois

FARMALL'S 20th Anniversary

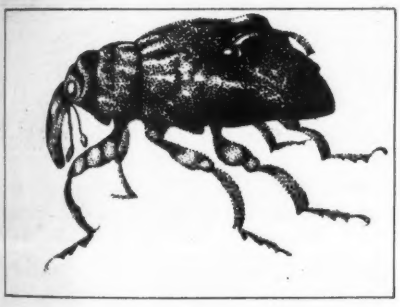
CLOSE UPS
OF THE MORE COMMON FRUIT INSECTS



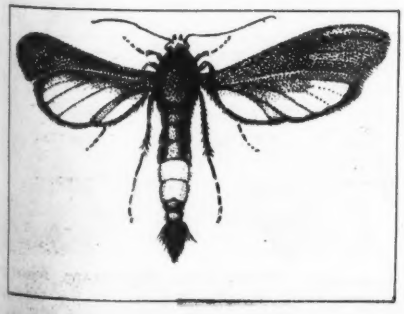
CODLING MOTH—Iridescent bronze patches on the tip of the forewings distinguish adult moths. The apple shows a typical worm sting.



ORIENTAL FRUIT MOTHS—The adults are gray with brownish markings on the wings. The yare smaller than the Codling Moths.



PLUM CURCULIO—The adult is a snout beetle about 1/4 inch long with light colored patches on its back and 4 typical humps.



PEACH BORER—The female adult has an orange band on the abdomen, transparent hind wings and may be often mistaken for a wasp.

By DWIGHT M. DELONG
Ohio State University

THE emergency situation of the past two years has stimulated increased crop production in all fields of agriculture. As a result many new fruit growers are attempting to help in this area of production. New managers have been obtained to substitute for experienced managers who have entered military service or one of many war plants. In view of these new comers, particularly among the fruit growers, it seems advisable to have them meet a few of the more common and important fruit insect pests face to face and to know them a little better before they encounter them as serious problems in the field.

The Codling Moth

The Codling Moth is undoubtedly the most important fruit insect in the United States considering all problems and all areas. If the fruit grower were looking for it during these cold winter days, his best chance of finding it would be to look under the loose scales of bark on the apple trees in his orchard. This assumes that the degree of control the previous season has been inadequate and also that the woodpeckers have not hunted too extensively before the fruit grower began his search. If fortunate enough to find a silken lined cell which has been undisturbed he will discover a pinkish white caterpillar with a brown head. The caterpillar normally remains in this position and stage until rather late in the spring before it transforms to a brownish pupal stage. In from two to four weeks afterward the true moth stage emerges from the brown pupal case. The moth is gray in color with chocolate brown patches at the tip of the forewings. The moths are seldom seen because they are inactive and concealed under the leaves or bark during the day. Mating and egg laying occur at twilight when both the temperature and humidity are high. After mating, the female moths lay flat discoid transparent eggs on the apple leaves but not until some two to four weeks after the apples have blossomed. The eggs are so flat and inconspicuous that they can seldom be seen except by experienced

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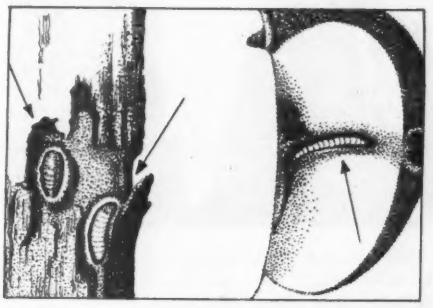
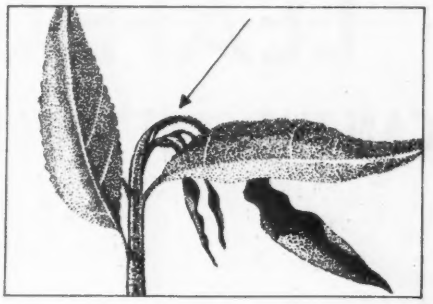
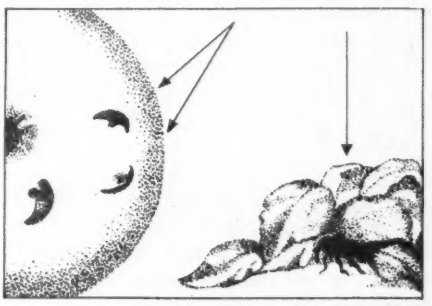


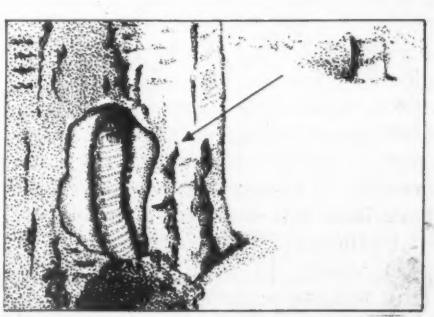
Codling Moth larvae overwinter in cocoons on trunks of trees shown above at left. Drawing at right shows how worms eat the fruit.



Typical injury to peach twigs by larvae of the Oriental Fruit Moth. The tender twigs are killed by the boring worms as shown above.



The Curculio makes characteristic crescent-shaped punctures when laying its eggs in apple. It overwinters under fallen leaves.



Peach Borer larva damages by boring into the trunk of the tree. It may girdle and shorten the life of the tree, or sometimes kill it.

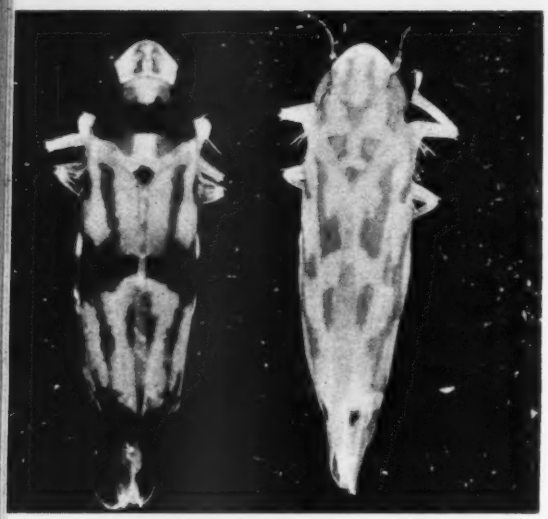


Figure 1. The winged adult leafhopper is about one-eighth inch long. The species shown here attacks both apple and grape.

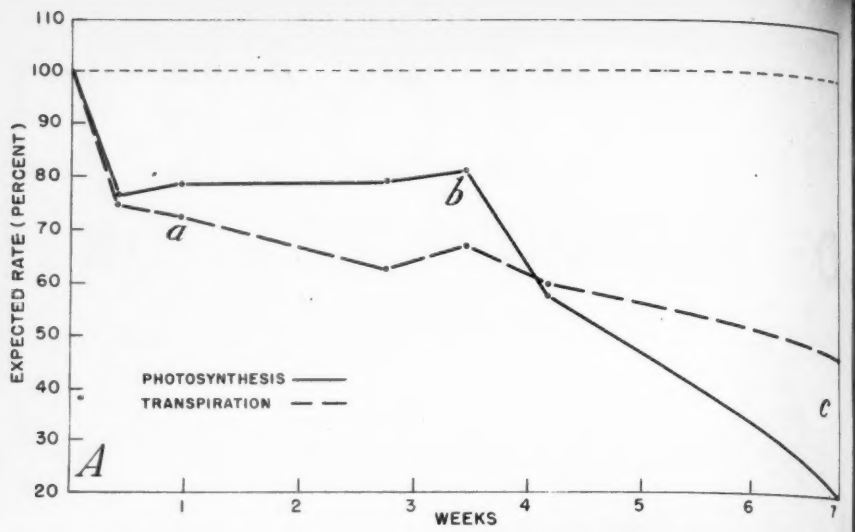


Figure 2. Chart shows how leafhopper feeding injury may reduce photosynthesis of apple leaves. See Figure 3 for appearance of leaves at "a", "b", and "c" as indicated in above chart.

LEAFHOPPERS

CAN THEY GET THE CREAM OF THE CROP?

By N. F. CHILDERS
Ohio State University

THE codling moth performs its sabotage more or less in the open and directly on the fruit—but not the leafhopper. The leafhopper operates somewhat like a termite, quietly doing its damage under "cover" of the leaves, and the damage is not apparent until harvest when the grower finds poorly colored fruit of reduced size.

The leafhopper and red mite could be placed in the same category insofar as "underground movement" to the tree is concerned. Both insects suck sap, starting early in the season in relatively small numbers, and increasing in population until August and September when the leaves are literally covered with the insects. Red mite injury results in a bronze cast to the foliage, and the tiny red mites, only a fraction the size of a pin head, can be seen slowly moving about over the leaf. On the other hand, apple leaves injured by leafhoppers have a grayish-white cast except where scattered and thick deposits of brownish-black excrement have been left by a large population of leafhoppers. When this occurs, it is necessary to wash or brush the fruit to remove these numerous "fly" specks. Under these conditions, too, the leafhoppers are so thick they fly out in swarms when the foliage is shaken. Some growers call them "gnats" or small "grasshoppers" which are a persistent nuisance while harvesting. Actually, the winged adult apple or grape leafhopper is only about one-eighth inch long.

Three species of leafhoppers may cause important damage to apple leaves. The apple leafhopper (Typhlocyba pomaria, McAtee) is responsible for most of the damage, probably 75 or more per cent of it. The grape leafhopper (Erythroneura sp.) may comprise the balance of the population of leafhoppers, except for an almost insignificant number of potato leafhoppers (Empoasca fabae, Harris). However, if there is a potato field near the apple orchard, they may cause considerable damage to the apple shoots. These leafhoppers suck upon the veins on the underside of the apple leaf and interfere with translocation of food material out of the leaf. The shoot leaves develop poorly, wrinkle, curl and are mottled with green and yellow areas.

The apple and grape leafhoppers, on the other hand, obtain their juice from portions of the leaf between the veins. Their injury to apple leaves is shown in Figure 3. If the leafhoppers are not controlled early in the season, they multiply rapidly and in August they will have caused considerable damage to the photosyn-

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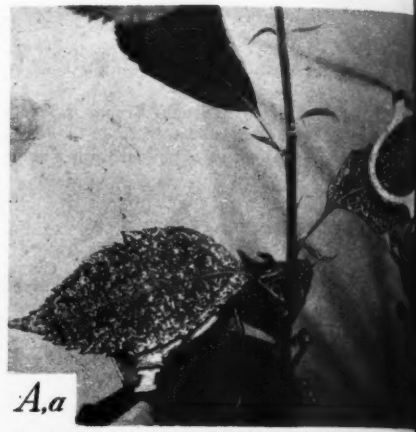

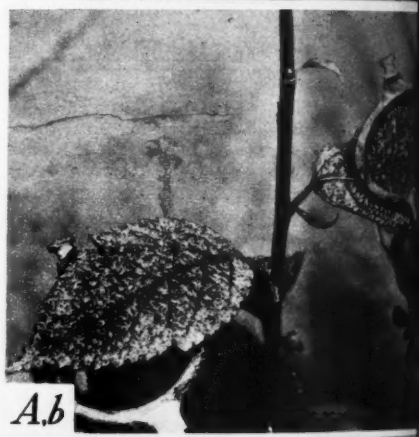

Figure 3. The above photograph shows three stages of leafhopper injury on the same apple leaves. "Aa" is the first stage and "Cc" the last stage. Chart in Figure 2 shows respective reductions in apparent photosynthesis for these leaves.

NEED FOR NATIONAL FRUIT COUNCIL

IN AN important article in the January, 1944, issue of AMERICAN FRUIT GROWER on "The World Fruit Situation and Post-War Problems," Fred A. Motz, Office of Foreign Agricultural Relations, U.S. Department of Agriculture, appealed for the organization of a national fruit council in this country to speak in the post-war period for American fruits. On this page American leaders give their views on the need of such a council to deal with export and domestic fruit problems after the war.—EDITORS.

POST-WAR EXPORTS

John Chandler, Sec'y
National Apple Institute

FRED A. MOTZ of the Office of Foreign Agricultural Relations, U.S.D.A. in his enlightening article in the January issue of AMERICAN FRUIT GROWER, places a challenge before the fruit and vegetable industries of the United States, which demands serious attention.

The apple industry in the generation between the World Wars became geared to an expanding export market, which drew off each year our surplus apples and maintained the domestic market in a healthy condition, until this development was arrested by the world depression and the nationalistic barriers which it engendered. Apple growers are well aware of the devastating prices which resulted when exports were fading out during the late dreary thirties.

As Mr. Motz points out, there is now before us a clean sheet on which we will write the next page of the history of the fruit exports from the United States. He urges us to equip ourselves with a representative national council to determine,

(Continued on page 24)

I.A.A. STANDS READY

Samuel Fraser, Sec'y
International Apple Association

I GREATLY appreciate the opportunity to read the article by Fred A. Motz covering the World Fruit Situation. This is a most important contribution. The problem is one in which the International Apple Association has done an immense amount of work.

For fifty years this Association has been a spokesman for the apple industry in the United States. It's success soon led to Canadian representation and the development of an international membership. At the opening of World War No. 2, the membership of the Association was established in twenty countries. The Association maintains, even at the present time, although it is a war casualty in London, a branch office near London. We are not only ready to participate and cooperate in the development of mutual understanding and the proper development of the markets outside the United States, but believe that so far as apples and pears are concerned no organization in the world offers like facilities. The Asso-

(Continued on page 24)

FOR FREE, VOLUNTARY BODY

Carroll R. Miller, Sec'y-Manager
Appalachian Apple Service, Inc.

MR. MOTZ quotes Secretary of State Hull's letter suggesting "an organization . . . which . . . made arrangements concerning shipment of apples . . . overseas." That is, curtly, government control; government saying how many apples and what growers' apples, shall be exported; and when. It contemplates dividing up the markets of the world by governmental decree, instead of by competition.

In giving strongly qualified approval to Mr. Motz' suggestions, I would make these points:

1. We are moving, rapidly, toward internationalism. The day of local government is already past; superseded by national government; and that is moving toward international government. President Roosevelt said, returning from Teheran, that he and Stalin have agreed on an international police force. Almost all peace plans look toward a world govern-

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A.P.S. OFFERS SERVICES

T. J. Talbert, Pres.
American Pomological Society

WE AGREE with Fred A. Motz, U.S. Department of Agriculture, that the fruit situation in the United States demands prompt, judicious and representative action to safeguard the industry particularly in the post-war period. Ample justification is shown when fruit having an average annual value of $87,000,000 ranks first in importance among foods exported. It is obvious that interests in fruits should be maintained and that exports must be given adequate support and encouragement.

Since the United States is the only major fruit producing country normally dependent upon exports, which is not prepared to represent all horticultural interests by speaking in one united voice through collaboration with our government joint action of all the horticultural interests of the nation should be taken without delay in order to be properly

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CLOSER UNITY NEEDED

Paul Stark, Vice President
Stark Bro's Nurseries

THE FRUIT industry of the United States is of such importance and is so widely scattered throughout the country that it is highly desirable to have closer unity between all the various groups producing the different kinds of fruits. The importance of this has been emphasized by Fred A. Motz's recent article in AMERICAN FRUIT GROWER. The post-war problems, export trade and allied matters emphasize the need of an over-all organization that will be truly a representative body that can consider and make recommendations in matters affecting the entire fruit industry, both in domestic problems and foreign matters.

It has been suggested that the American Pomological Society, which has for many years been interested in all types of American grown fruit, would be the logical group to act as a nucleus in establishing a representative national fruit

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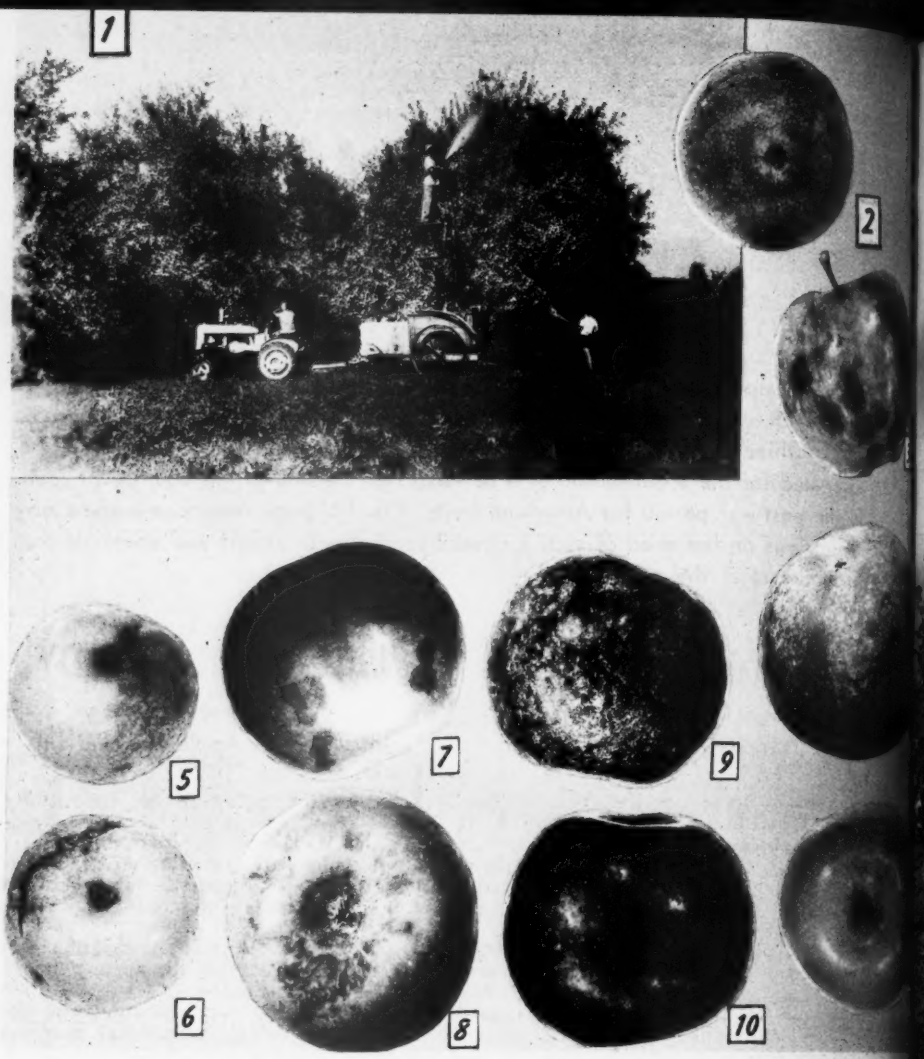
ADVISORY COUNCIL URGED

Thomas H. O'Neill, Manager
New York and New England Apple Institute

AFTER the war, unquestionably the fruit growers of the United States will have to participate in the tremendous responsibility of feeding and rehabilitating the conquered nations. Surely, if we are to pursue the Good Neighbor policy, the feeding of these conquered nations is a major concern.

Because of these two reasons I agree with Mr. Motz that some sort of International Fruit Board is needed, and if the various fruit industries have the proper representative on this Board, much can be accomplished not only in seeking a solution to the many export problems, which are bound to arise, but also to protect the interests of the respective

(Continued on page 35)



To control the codling moth satisfactorily adequate equipment is necessary. This (1) is the type used in the Purdue University Agricultural Experiment Station studies at the Elrod orchard. Control of apple scab (2) goes hand in hand. The codling moth program must begin at the petal fall spray to prevent first brood injury (3). The early scab sprays and the first ones of lead arsenate combinations may result in russet (4). In some instances arsenic injury alone may be most severe (5 and 6) although its development often starts early in the season. Oil used to increase the efficiency of the control program may result in various types of fruit injury (7 and 8). After receiving schedules that will control severe codling attacks the fruit usually carries undesirable residue (9). However, if the knowledge available to all is used, high quality fruit of either red (10) or yellow (11) varieties may now be grown no matter how severe the codling moth attack.

ADVANCES IN CODLING MOTH CONTROL

By G. EDW. MARSHALL
Purdue University

"THIS is the best crop of apples we've ever grown." These are the exact words of H. V. Elrod, who for the past 35 years has been an apple grower in Lawrence County of Southern Indiana and a long time co-operator with the Purdue University Agricultural Experiment Station. Mr. Elrod made this statement during Winesap harvest last fall after a season teeming with problems resulting from mistakes made by inexperienced orchard help, difficulties in securing spray materials and metal or rubber sprayer replacement parts, not to mention a season of unusually heavy codling moth attack. In addition, the members of the spray crew were women, made up of a school teacher and members of the senior class in high school.

This outstanding measure of success in codling moth control was attained in an orchard 30 years old. The trees range up to 32 feet in height and this planting has always presented a serious problem in control as the result of its natural infestation and the inflight of moths from surrounding orchards.

The pressure put on apple growers for increased effort and the listing of apples as an essential wartime food crop convinced Mr. Elrod and those doing the work, that the close supervision and the few additional operations necessary to produce a high grade crop were warranted this year. Accordingly, the first operation deemed necessary for good codling moth control was pruning. Although the trees were in the pre-pink stage before the work was started the job was finished before the season had progressed too far. In the face of a scarcity of labor the pruning, not to reduce tree height but to thin out the trees and to remove dead branches, was accomplished by piece work. Seventy-five cents per tree was paid for this work.

Choosing a spray program for use finally lead to the selection of four distinctive schedules. All of these with many other programs had undergone two or three years of preliminary tests on single tree plots of several varieties. They were selected as the four offering the most promise of success if applied on a commercial scale by Indiana growers. The orchard was divided up into 50 tree plots. Five varieties were used in each program. Regular spray methods were adopted except that special efforts were made to see that the tree tops were well sprayed. Each complete application included a good cover to the under side and the lower half of the tree by the girl on the ground and a thorough spraying of the upper half from the tower where the gun was handled between 18 and 20 feet above the ground.

Treatment 1 was developed pretty largely by L. F. Steiner and Associates at the U. S. Deciduous Fruit Insect Laboratory at Vincennes, Indiana. The spray mixture used contained five pounds of Wyoming bentonite, one pint of nicotine sulphate and one quart of soybean oil per 100 gallons of solution for the first three sprays. The fourth and fifth applications contained eight pounds of Mississippi bentonite, one pint of nicotine sulphate and one quart of mineral oil per 100 gallons. The sixth spray contained eight pounds of Mississippi bentonite, one pint of nicotine sulphate and one quart of soybean oil,

(Continued on page 24)

DWARFING ROOTSTOCKS

AND THE SMALL EARLY-BEARING APPLE TREE

By H. B. TUKEY

Chief in Research, New York State Agricultural Experiment Station

Above, orchard of uniform 5-year-old semi-dwarf trees (Baldwin/Malling XIII).

Top right, a 5-year-old apple tree with good promise of a crop growing in sod mulch (Delicious/Malling IV).

Right center, Baldwin/Malling IX—2 years old. Baldwin does well as a dwarf tree, also.

Lower right, 2-year-old tree of Grimes Golden/Malling IX—especially useful as a dwarf tree for garden planting.

THE quest for the small early-bearing apple tree continues. It seems more than a desire merely for a small tree—rather it seems a desire to satisfy by a single means a great number of quite distinct needs which have arisen in the fruit industry. Some of these needs are of long standing, some of them are either injected into the industry by the war or intensified by it, and some belong to both categories. The more important may be listed briefly as:

Earlier fruiting

Larger number of trees per acre

Easier and more economical spraying, thinning, pruning, harvesting, and hand-pollinating

Higher yields of fruit per acre

Easier and more economical raising of "young" trees and renewal of "older trees" in the "rotation orchard system"

Better adaptation to local environment

Improved quality of fruit through better opportunity for coloring, for spot picking, for tree ripening, for freedom from insect and disease blemishes, for thinning, for reduction in bruising, and for reduction in number of culls.

And all of these desires are seemingly now converging upon the idea of the DWARF FRUIT TREE, brought about quite naturally because just at the moment considerable interest has arisen in a series of dwarfing rootstocks for the apple which are relatively new to this country and which offer some promise.

But before going further, it should be emphasized that not all of the desires enumerated above are peculiar to the possibilities with dwarfing rootstocks. There are other horticultural means of satisfying many of them. A discussion of the general problem

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THE CENTER FLOWER IS OPEN BUT THE LATERAL FLOWERS ARE STILL CLOSED
With self fruitful varieties the setting of a commercial crop from this center flower is usually well under way when the lateral flowers open.

THE FIRST DAY OF FULL BLOOM
The lateral flowers have just opened and can be destroyed without preventing fruit set by most of the center flowers. The anthers in the center flower are ripe and shedding pollen while those in the lateral flowers are still green.

SOME POSSIBILITIES OF THINNING CERTAIN VARIETIES OF APPLES WITH A SPRAY RIG

By M. B. HOFFMAN
Cornell University

IN many seasons it is necessary to thin certain varieties of apples if fruit of good commercial size is produced. The earlier the thinning is done the more it will contribute toward annual bearing. While hand thinning of a heavy crop during the summer months can usually be depended upon to improve both the grade and the size of the immediate crop, it is not practical to thin sufficiently early to promote annual bearing of biennial trees. With the present acute labor shortage and the high price of inexperienced help, many growers are now finding it increasingly difficult to accomplish even a partially satisfactory job of hand thinning.

During the past several years, some attention has been given to the possibility of thinning apples with a caustic spray at bloom time. This is not a new idea, but materials relatively new to the fruit growing industry are now being tried with some success for this purpose. Several years ago it was learned that the sodium salt of dinitrocresol at concentrations of 0.1 to 0.2 per cent was toxic to pollen and would prevent the setting of fruit if applied immediately after the flower opens. This chemical is being used as an insecticide and is available to the trade as a proprietary product. Since it is completely soluble in water, which makes possible the preparation of exact concentrations of very dilute solutions, it has been used as the toxicant in the work referred to here.

The question naturally arises as to how it is possible to spray a tree at blossom time with such a material so that some flowers are left to develop fruits while others are destroyed. That is, if the spray kills any flowers, why does it not kill all of them? The explanation seems to lie in the fact that the freshly opened flowers and flowers on weak spurs are more susceptible to a given concentration of the toxicant than are the more advanced flowers on spurs of good vigor.

There are six flowers on each apple spur, a center flower at the apex and five lateral flowers. The center flower always opens one day or more before the lateral flowers. The time elapsing between the opening of the center flower on each spur and the lateral flowers will depend largely on the prevailing temperature. The spray will destroy a flower that has been open for only several hours but does not seem to prevent fruit setting if the process has been in progress for a day or more. With trees of such heavy setting varieties as Wealthy and Baldwin, a commercial crop from the center flowers is usually assured by the time the petals on the lateral flowers unfold.

It is just at this stage of development, the first day of FULL BLOOM or just as the lateral flowers open, that a thorough application of the spray has resulted in the most satisfactory job of thinning. The spray prevents the set of fruit by lateral flowers yet permits fruit to develop by the older center flowers. In this way doubles and triples are largely avoided.

Theoretically such an arrangement should leave one apple to develop on each blossoming spur which would still likely be too large a crop. Actually this is not the case. The spray seems to prevent fruit set by all flowers on some of the weak spurs toward the center of the tree and those on crowded or shaded wood. In this way it eliminates most of the small green fruit borne on weak wood which is normally removed by a detailed pruning.

Considering the way in which the spray seems to accomplish thinning, it is apparent that correct timing of the application is very important. If 90 to 95 per cent of the lateral flowers of the spurs are open by noon or mid-afternoon on a given day, it would be best to spray that day rather than wait until the following day. Delaying the spray for an entire day to allow every lateral spur flower to open has resulted in insufficient thinning. The force of the spray will knock off very few petals the first day of full bloom unless the sequence in the opening of flowers has been prolonged for 4 or 5 days by cool weather. If, as the spray is applied, petals fall in great profusion, it is

(Continued on page 16)

Take a leaf from the book of the good orchardist

Sound Apples must be Aphis-Free

For Thirty Years the Standard

Black Leaf 40

Use Black Leaf 40 to protect the vigor of your trees from Early Spring Attacks by Aphids • Timely spraying with Black Leaf 40 prevents deformed fruit and foliage, controls green and rosy aphids, bud moth and red bug. Black Leaf 40 can be combined with all standard sprays; — is effective and not harmful to buds or leaves.

• For codling moth cover sprays use

BLACK LEAF 155

Non-caustic protection for foliage permits the manufacture of more food by the leaves and matures fruits of larger size.

• Black Leaf 155 controls codling moth, aphids, leafhoppers, bud moth, leaf miners, pear psylla and grape berry moth.

TOBACCO BY-PRODUCTS & CHEMICAL CORPORATION • INCORPORATED
LOUISVILLE 2, KENTUCKY

Early McIntosh—Not thinned. At harvest the fruits average 373 per box. Prevailing size 2 inch.

Early McIntosh—Thinned with bloom spray—one pint toxicant per 100 gallons water. At harvest the fruits averaged 199 per box. Prevailing size 2½ inch.

THINNING CERTAIN VARIETIES OF APPLES WITH A SPRAY RIG

(Continued from page 14)

an indication that the treatment is being made a little late for best results. The variety Wealthy often forms fruit buds laterally on the terminals. These flowers usually open several days after the spur flowers. The spray correctly timed to thin the spur flowers will not reduce the set of the late opening flowers on terminals. Some growers have used a second application to thin these flowers.

Most of the work in New York State has been done with Wealthy. However, equally good results have been secured with Transparent, Early McIntosh, Duchess, Baldwin, Golden Delicious and Rome Beauty. Table I gives some of the results secured with Wealthy in a vigorous, well-cared-for orchard located on good fruit soil. In 1941 hand thinning increased the size of fruit but did not result in any tendency toward annual production in 1942. The blossom sprays thinned the crop in 1941 sufficiently to produce commercial sized fruit without hand thinning and because of the earliness of the thinning these trees produced from about one-half of a crop to a full crop in 1942. Further work in this orchard since 1941 has shown that one quart of the toxicant per 100 gallons of water (or a concentration of 0.25 per cent) gives the best results for these particular trees.

This concentration would not necessarily hold for all Wealthy or for trees of other varieties. A grower in Western New York sprayed 700 Wealthy trees in 1942 with a concentration of 1½ pints of toxicant per 100 gallons of water. Twelve thousand bushels of fruit, 90% of which was 2¾ inches and up was harvested from the block. As a result of the thinning at bloom time in 1942, these same trees bore a crop of 11,000 bushels in 1943. The trees are 20 years old and this is the first time they have borne two commercial crops in consecutive years.

Other tests indicate that one pint of the toxicant per 100 gallons of water may prove adequate for thinning Wealthy of only moderate vigor. Trees located on shallow soil or soil lacking in good internal drainage might be so classed even though they have been well fertilized and pruned. Similar results showing the relationship of tree vigor to concentration of spray in the reduction of fruit set has been obtained with Early McIntosh and Rome Beauty.

The data on Baldwin in Table II will suffice to illustrate results that have been obtained by the same technique with another heavy setting variety. These trees were about 30 years of age, located on good fruit soil, pruned moderately heavy and liberally fertilized. The terminals were making a thick growth of 15 to 24 inches annually. The check trees set very heavy and 27 per cent of the fruiting spurs bore clusters of 2 or 3 apples. Both of the spray concentrations eliminated most of the doubles and triples, reducing the set of bearing spurs to single fruits. About 50 per cent of the fruit from the check trees graded 2¼ inches. The size of fruit produced by the sprayed trees ranged from 2½ to 3 inches. The vigor of these trees was sufficient to size up the fruit well in spite of the fact that a rather large per cent of the blossoming spurs bore an apple.

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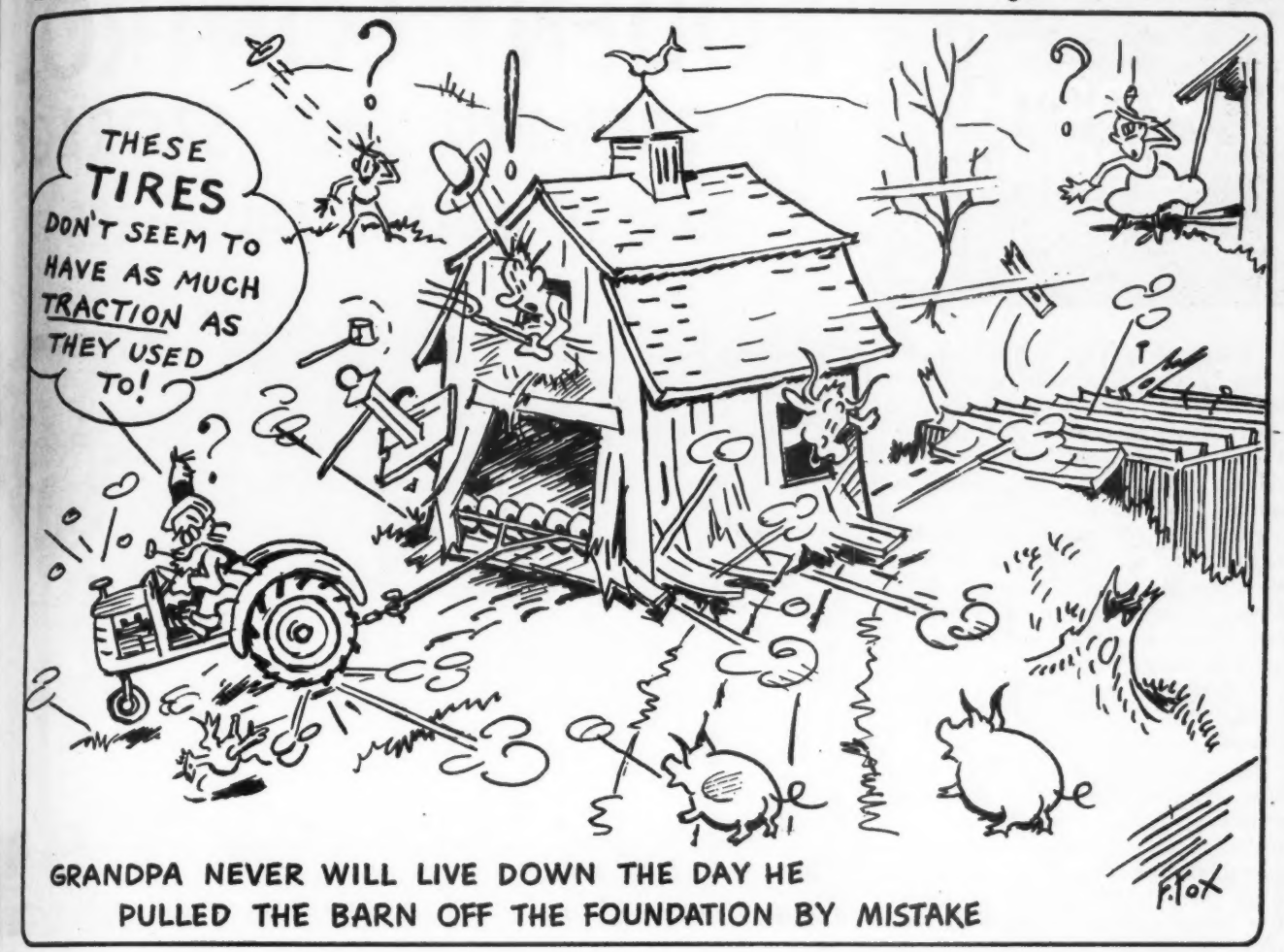
TABLE I. The Effect of Sodium Salt of Dinitro Cresol, Applied at Full Bloom on Yield, Size, and Annual Production of Wealthy Apple Trees.

Per Cent concentration	*1941*		*1942*	
	Av. No. Fruits per box	*Av. No. Boxes per tree*	*Av. No. Fruits per box*	*Av. No. Boxes per tree*
	No Hand Thinning			
Check	182	15.4	108	2.6
	Hand Thinned June 23			
Check	116	11.5	104	2.0
	Sprayed First Day Full Bloom—No Hand Thinning			
0.2	124	15.0	110	8.7
0.3	100	13.0	96	13.3

SPEAKING OF TRACTION — By Fontaine Fox



GRANDPA NEVER WILL LIVE DOWN THE DAY HE PULLED THE BARN OFF THE FOUNDATION BY MISTAKE

Why Not Find Out About Traction For Yourself?

WHEN you buy tractor tires you want TRACTION with a capital T. Isn't that right? Here's a way to find out just what type of tread design provides the greatest traction. On your neighbors' farms you will probably find all different makes of tires in operation. Compare them carefully. Remember that in order to provide the greatest traction a tire should

1. **bite into the soil**
2. **grip the ground without slipping**
3. **be self-cleaning. (If the tread clogs, it just can't bite and grip.)**

Keep these points in mind as you watch the various types of tread designs in operation on your neighbors' farms. See for yourself why the tough, long-wearing B. F. Goodrich Silvertowns give you just the kind of traction you want.

Watch the Bite: the extra-high cleats and the open-center design of the Silvertown give a deeper bite.

Watch the Grip: paired cleats of the Silvertown give double grip. Extra-heavy shoulders provide maximum pull.

Watch for Self-Cleaning: the tread design is open — no mud-catching pockets. And because it's open, it's flexible — the cleats spring the dirt free with a sling-shot action.

Only three points to watch — yet they give you the whole story on traction. Make this check before you buy. We think you will agree that B. F. Goodrich Silvertowns give you the "best traction on earth."

"The Best Tires on Earth"

B.F.Goodrich

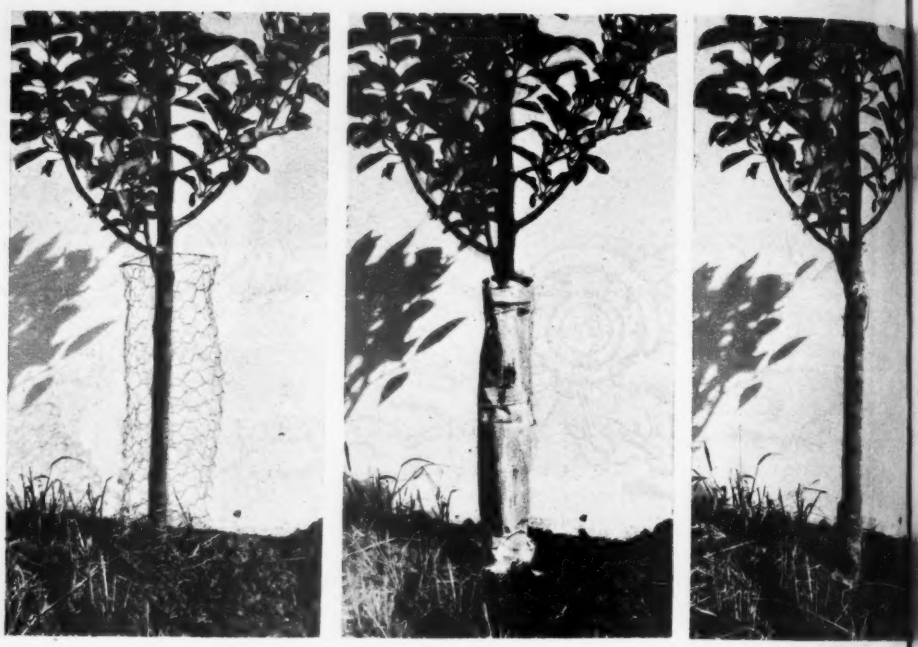
FIRST IN RUBBER

Rubber is still mighty scarce. You help your country by making every tire you own last just as long as possible.

WORTH CLIPPING

RODENT CONTROL IN ORCHARD AND STORAGE

PART IV—RABBITS AND HARES



A cylinder of woven wire netting, above left, is effective for protecting individual trees from rabbits. Newspapers, above center, are good protection against rabbits. However, mice will burrow underneath to the trunk. Burlap, above right, is also useful as newspapers against rabbits. Burlap and paper wrapping should be removed in the spring.

IN the Eastern part of the United States there are several native species of rabbits and hares which may become pests because of their injury in orchards, nurseries, truck gardens and other farm areas. Although these animals are protected in many states as game and are trapped and hunted for food and sport, they may have to be controlled where damage takes place. Hence, before undertaking control measures, the fruit grower or farmer should become acquainted with the game laws and, in case of doubt, confer with local and State game wardens.

There are two general classes of these animals with which the fruit grower is primarily concerned: the smaller forms, generally called cottontail rabbits (Sylvilagus spp.) and the larger forms which include the snowshoe hares and jack rabbits (Lepus spp). Wherever jack rabbits are found in the East, they have been introduced, and, as a rule, only occur locally in small numbers. Therefore, their habits and control will not be discussed.

Cottontail rabbits occur in every state but as yet are not found in the northern parts of Maine, New Hampshire, Vermont, New York, Michigan, Wisconsin and Minnesota. However, they are gradually extending their range northward.

Varying hares, or snowshoe rabbits, are found throughout most of New England and New York, and southward in the Appalachian Mountains, parts of Pennsylvania, Maryland, West Virginia and Virginia, in the northern parts of Minnesota, Wisconsin and Michigan, and in the Rocky Mountain States. In general their range is mostly north of that of the cottontails or at higher altitudes.

Cottontail rabbits live in brush thickets, edges of woodlands and in open grassy fields. They are promiscuous in their sex relationships and breed several times each year during the warmer months. The gestation period is approximately 30 days. The young are born blind, naked, and helpless, and there are 5 or 6 to the litter. The nest, in which the female deposits the young, is, when above ground, a shallow hole or depression and is composed of dead grass and lined with fur plucked from the mother's body.

The male rabbit takes no part in caring for the young, which grow rapidly and, at the end of about 2 weeks, are able to move out of the nest for limited distances and eat grass.

Cottontail rabbits feed exclusively on vegetation. They prefer succulent foods, but they will eat all sorts of herbage such as flowers, leaves, stems and seeds of herbaceous plants and grasses; also leaves, buds, bark, and fruits of woody shrubs and trees. They are especially fond of the bark of apple trees.

It is well known that the numbers of cottontails are at times subject to great fluctuations. However, abnormal increases in these small rabbits are held in check usually by epizootics (diseases), natural predators—such as foxes, weasels, wildcats, hawks, owls, etc.; and by sportsmen. In spite

(Continued on page 34)

AS A PART of the fruit grower's battle to conserve food during this total war, it is highly important for him to reduce losses to orchards and stored fruit crops by curtailing damage done by several species of rodents. The accompanying article on "Rabbits and Hares" is the fourth of a series of five noteworthy articles on "Rodent Control in Orchards and Storage." This article has been prepared especially for AMERICAN FRUIT GROWER by Robert M. Borg, Assistant District Agent, Division of Predatory and Rodent Control, Fish and Wildlife Service, United States Department of the Interior. If after reading the accompanying article you desire further information, it is suggested that you write your County Agricultural Agent or the District Agent, Fish and Wildlife Service.—Editors.

VICTORY IS OUR BUSINESS

—and we know

IT'S YOUR BUSINESS TOO!

The American farmer's job is a good deal like a manufacturer's. His farm is his factory. His equipment is his machinery. His soil and seed and livestock are his materials. Right now he knows that bumper food production is needed for the war effort—just as we of General Motors know that weapons of war must flow from our plants in huge volume.

America and its allies depend on farming and manufacturing to meet the hungry demands of war. You must *feed* our fighters; we must *arm* them.

And so the farm and factory form a sort of "partnership"—a partnership that is doing a mighty good job so far. It's a job that's founded on plain hard work, skill, determination and management know-how. Those are the things that count—in both farming and manufacturing.

And our "partnership" goes even deeper than that. It goes as deep as freedom—that old-time American freedom to tackle *your* job *your* way . . . to give it all you've got—and to get the rewards you earn.

Let's ALL Back the Attack! BUY WAR BONDS

GENERAL MOTORS

CHEVROLET • PONTIAC • OLDSMOBILE • BUICK • CADILLAC • FISHER BODY

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STATE NEWS

MARYLAND—With a heavy attendance of growers from Maryland and the surrounding States, the Forty-Sixth Annual Meeting of the Maryland State Horticultural Society opened with a discussion of peach varieties in which Dr. A. L. Schrader, University of Maryland, stated there were too many new and untried peach varieties and growers should hesitate to expand, but should plant for reasonable replacement, analyzing the variety list and also suggesting suitable ones for commercial use.

The great value of national organizations of fruit growers was stressed as a means of making their desires heard by Government officials.

As post-war plans, it was suggested that growers build their soils, lay up some financial reserves, join the regional advertising groups, and strengthen their organizations for competition to come. It was reported that Maryland has an ideal set-up of good apple varieties but growers were also warned that there would be heavy competition of by-products after the war. Canners, dehydrators, freezers and other by-products men will be working hard to improve their products and growers must plan to sell better stock to these men and must also forget that they can send any kind of poor fruit overseas in post-war export trade. The by-product developments will extend the market season for all fruits.—A. F. VIERHELLER, Sec'y, College Park.

MASSACHUSETTS—The 50th annual meeting of the Massachusetts Fruit Growers' Association was held in Worcester on January 5 and 6 in connection with the 26th annual Union Agricultural Meetings. An interesting talk on the 50-year history of the Massachusetts Fruit Growers' Association was presented by Dr. Fred C. Sears, Professor Emeritus. Massachusetts State College. Two charter members were present and were given proper recognition: H. Ward Moore and H. R. Kinney, both of Worcester.

There was much grower interest in the magnesium deficiency situation in the State. Evidently this deficiency is becoming more widespread and in not a few instances very serious in commercial apple orchards. The best methods to cope with the trouble were outlined by research men from the Experiment Station.

Donald L. Priest of Groton was elected president of the Association.—LAWRENCE SOUTHWICK, Massachusetts State College, Amherst.

MINNESOTA—Four new hardy grapes are being introduced this month by the University of Minnesota Fruit Breeding Farm. Two of these new varieties are dark purple grapes, one named Blue Jay and the other named Bluebell. Red Amber is the name of a new red variety. The fourth of these new grapes has been named Moonbeam, in recognition of its translucent green color.

These grapes will be of special interest to non-commercial growers in northern regions where standard table varieties of grapes can not be raised successfully. They compare favorably in size and quality to standard table grapes, yet they retain much of the hardiness of the small and inferior Beta grape that is so often grown in the north for juice purposes. All four varieties have been under test for hardiness and productivity for some 20 years, and vines may now be obtained from Minnesota nurserymen. Growers in regions where good table grapes can be grown without winter protection will not be interested in these new productions which offer no advantage over standard sorts except as to hardiness. They constitute, however, a very marked improvement over hardy grapes formerly available.—J. D. WINTER, Sec'y, Mound.

NEW YORK—The annual meeting of the New York State Horticultural Society was held at Convention Hall, Rochester, January 13-16th with very good attendance.

M. E. BUCKMAN

M. E. Buckman, Manager of Sodus Fruit Farm, Inc., of Sodus, was elected President and John Hall of Lockport was elected Vice President. Other Directors elected under new by-laws, adopted at the meeting, were Gerow Schoonmaker of Walkill, A. W. Densmore of Albion, Seymore W. Davenport of Kinderhook, Theodore A. Cross of Lagrangeville, Herman Kappell of Lyons, Donald Green of Chazy, James Austin of Hamlin, Frank W. Beneway of Ontario, George T. Bradley of Appleton and Robert R. Livingston of Germantown.

Speakers on the program included Dr. P. J. Chapman, Entomologist at the Geneva Experiment Station, W. D. Mills of Cornell, Plant Pathologist, Dr. J. M. Hamilton of the Geneva Experiment Station who outlined new spray programs for 1944.

Dr. M. B. Hoffman of Cornell outlined some possibilities of cutting the Labor for Fruit Thinning with Bloom Sprays.

Guest speaker from the State of Michigan was George G. Farley of the Farley Fruit Farm, Albion, Michigan. Dr. J. R. Magness, Head Horticulturist in charge of Bureau of Plant Industry Station of Beltsville, Maryland and Carl S. Wooster, Chief Fresh Marketing Division, Fruit and Vegetable Branch, F.D.A., Washingtton, were other out of state speakers.—ROY P. McPHERSON, Sec'y, LeRoy.

CALENDAR OF COMING MEETINGS and EXHIBITS

Feb. 9-10—Annual Meeting of Nebraska State Horticultural Society, Lincoln.—E. H. Hoppert, Sec'y, Lincoln

Feb. 10-11—Annual meeting of Kansas State Horticultural Society will be held in conjunction with Farm and Home Week, Kansas State College, Manhattan, —Geo. W. Kinkead, Sec'y, Topeka.

Feb. 11-12—Annual meeting of West Virginia Horticultural Society, Martinsburg. —Carroll R. Miller, Sec'y, Martinsburg.

Feb. 11-12—Maine State Pomological Society Annual meeting, Hotel DeWitt, Lewiston.—J. H. Waring, Sec'y, Orono.

INDIANA—At the Annual Meeting in December, V. V. Clarke was re-elected President; Chas. E. Scott, Yorktown, re-elected Vice President, and Dr. Laurenz Greene, Chief in Horticulture, Purdue University, was renamed as a member of the Executive Committee for the next three years. The hold-over members of this committee are Meredith Reed, Vincennes, the Indiana member of the National Apple Planning Committee, and Ferd Bolten, Linton.

Mr. W. C. Reed, of Vincennes, was awarded a Certificate of Distinction by action of the State Board of Horticulture at the Annual Meeting. This certificate was awarded by the Society in recognition of Mr. Reed's many years of leadership in and his great service to the orchard and nursery industries of the State of Indiana and of the United States. W. C. Reed is the senior member, with his son, Meredith, of the orchard firm of W. C. Reed and Son.

Gold medals were awarded to V. V. Clarke; the Simpson Orchard Company, of Vincennes, and to Floyd Jacoby, of Plymouth, for the production of quality plus apple crops grading above 90% U. S. No. 1 by tree-run sample. Dr. F. A. Kennedy, of Connersville, received a silver medal for the production of a crop grading just under 90% U. S. No. 1.

Members of the entomological and horticultural staffs constituted a panel for the discussion of problems faced in controlling the major insects and diseases. A new spray schedule released at the time of the meeting included a schedule providing for the use of nicotine for the control of codling moth and other apple pests in the various areas and under varying intensities of infestation in Indiana.—MONROE McCOWN, Sec'y, Lafayette.

ILLINOIS—The Horticulture Society of Central Illinois held a very interesting meeting at Quincy, January 10th and 11th, with attendance of a little over 100. Various speakers were on our program with the usual spray schedules and results, but the most grower interest was shown in the new scab and cedar rust spray "Fermate," a DuPont product which has given excellent results in experimental sprays last year.

Reports indicate that supplies of spray materials will be available enough to meet demands but spray machinery and packing house equipment was hard to get, and prospects for packing supplies including baskets and paper look very doubtful.

The following officers were elected: Marion Koeller, President, Bary; Wm. Weir, Vice-President, Gladstone; and Raymond Leeper, Sec.-Treas., Ursa.—C. C. MAST, Sec'y, Quincy.

PENINSULA—The newly elected officers of the Peninsula Horticultural Society for 1944 are as follows: President, Lester Newton, Bridgeville, Delaware; Vice President, Albert Fike, Cordova, Maryland; Treasurer, W. Lee Allen, Salisbury, Maryland; and Secretary, T. F. Manns, Newark, Delaware. At a meeting of the Executive Committee of the Peninsula Horticultural Society, Seaford, Delaware, January 7, the dates for the Fifty-Eighth Annual meetings were set for December 14 and 15, 1944, and the place selected was Dover, Delaware. —T. F. MANNS, Sec'y, Newark.

WISCONSIN—Much enthusiasm has been shown on the part of apple growers in the organization of the Wisconsin Apple Institute. Officers of the organization are C. J. Telfer, Green Bay, President; Wm. F. Connell, Menomonie, Vice-President; Arnold Nieman, Cedarburg, Recording Secretary-Treasurer; H. J. Rahmlow, Madison, Corresponding Secretary.—H. J. RAHMLOW, Sec'y, Madison.

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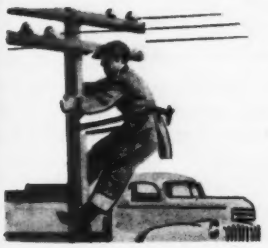

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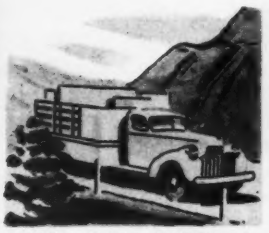

VITAL WAR SUPPLIES

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ECONOMICAL TRANSPORTATION

CLOSE-UPS OF FRUIT INSECTS

(Continued from page 9)

growers who know where to look and how to recognize them. In a few days the tiny caterpillars hatch from these eggs and after crawling to the fruit, enter the calyx end of the apple. Two generations usually occur during the season. Arsenate of lead and one of the fixed nicotines are the two materials usually used for control.

The Oriental Fruit Moth

The Oriental Fruit Moth is similar in appearance and life stages to the Codling Moth but in general it is not as widespread or important. Whereas the Codling Moth attacks only the fruit, the Oriental Fruit Moth injures both fruit and twigs. The first generation caterpillars hatch before the fruit is set and bore in the green twigs. The later generations attack the fruit in a similar manner to the Codling Moth. While the Codling Moth attacks only pome fruits, the Oriental Fruit Moth attacks both stone and pome fruits but is more especially a pest of peach. The caterpillars or larvae are similar in appearance to the Codling Moth caterpillar and are found in silken cocoons during the winter months either on the trunk of the peach tree or in rubbish on the ground around the orchard. These larvae transform to brown pupae in the silken cocoons early in the spring and soon the moths emerge, mate and deposit eggs in rather rapid succession. The adult moth is gray with chocolate brown markings on the wings quite similar to the color and appearance of the Codling Moth but smaller in size. The egg is flat, discoid and also similar in appearance to the Codling Moth egg. No spray material has been found to be effective for controlling this pest but paradichlorobenzene used as a soil treatment for the peach tree borer has been found to be an effective control for the overwintering larvae which are near the base of the tree.

The Plum Curculio

The name of this insect might imply that it is a pest of plum only. But it does attack both stone and pome fruits and is one of the major pests of apple, plum, peach and cherry. Many entomologists rank it second in importance as a pest of apples. This insect in the adult stage is a weevil or beetle with a long snout which it uses to secure food by gouging holes through the skin of the fruit. The adult or weevil stage is the overwintering form and is found under debris and in other protected places at this time of the year. It is dark brown in color with pale patches on the back and with four humps on the wing covers. Its rough appearance resembles the rough bark of the tree and when resting upon it they can scarcely be distinguished from the bark. Since they drop quickly when the tree is disturbed, the easiest way to observe them is to place a sheet under a portion of the tree and jar or shake the limbs just above it. The weevils become active on the trees about the time they blossom and feed upon the newly forming fruit. The females lay small white eggs in crescent shaped punctures in the skin of the fruit. The larva which hatches from the egg is white with a brown head and without legs. It burrows into the pulp of the fruit and if the apple falls to the ground it completes its larval growth and when full grown leaves the fruit, enters the soil and changes to a pupal stage. At least a month is required before the weevil emerges from the pupal case and begins feeding on the apple. This usually occurs about midsummer and the weevils continue to feed for the remainder of the summer on the fruit.

Cultivation and the use of arsenicals as dusts or sprays are the recommended control measures.

Rosy Apple Aphid

The Rosy Apple Aphid is the most injurious species of the three occurring on apple. The apple grain aphid is the most abundant but because it migrates from the apple early in the spring it seldom causes damage and is least important. The green apple aphis is second in importance. All three species pass the winter in the egg stage on the twigs of the apple tree. By careful examination of these twigs, the shining black eggs can be found in depressions, bud scars and similar protected places. The eggs begin to hatch when the apple buds start to burst in the spring. The young that hatch are all females, green and black in color with a waxy covering and a slight purplish or rosy tint which becomes more pronounced in the third generation. In about two weeks these females reproduce by giving birth to young which in turn produce the third generation in the same manner. This third generation develops wings and migrates to narrow leaved plantain for the summer but not until they have caused marked injury to the fruit. In addition to the curling of the leaves by large populations of these second and third generation females, they remain on the tree long enough to feed upon the fruit clusters. When they feed upon newly set apples normal drop is inhibited so that all the apples of the cluster remain on the tree and these continue to remain small and are gnarled or misshapen. In the autumn the winged aphids return to the apple, mate and the females deposit overwintering eggs. The fruit grower will see especially the hatching aphids on the buds in early spring and the curled leaves a little later with the rosy tinted forms inside. On examination he can also find the shining black eggs on the twigs in winter.

Combinations of oil emulsions and nicotine have been used for effective control and certain of the DN products have recently been recommended.

Peach Tree Borer

The Peach Tree Borer is a moth with clear wings which is the most important insect attacking peaches. The female is blue-black in color with a broad orange band around the abdomen. The male is black with several narrow yellow bands around the abdomen. These moths do not appear until midsummer. At the present time of year this insect can be found only in the overwintering grub or larval stage in the lower trunk or upper root portion of the tree. It mines in these portions of the tree either just below or just at the surface of the soil. Injury is noticed by masses of gum and frass or sawdust which are present where borers are working in any abundance. The larva is white with a brown head and brown plate just behind the head. It remains in the tree until late May or June when it changes to a pupa in a silken cocoon covered with gum and frass. The moth emerges from its cocoon in midsummer, mates and continues to lay eggs at the base of the tree until September. There is only one generation a year.

The recommended control is the use of paradichlorobenzene placed on the soil near the base of the tree.

European Red Mite

The European Red Mite is not a true insect but from the economic standpoint is classified as an insect pest. In certain respects it is more like a tiny spider and spins webs on the surface of the leaf where it feeds on the surface layer of plant cells. The adult mites are red in color with four rows of long curved spines on the back. These live on the under surface of the leaf and lay their red eggs on the under surface during the summer months. They become full grown in two or three weeks and there are several generations in a season. The mite overwinters in the egg stage which is dull red, spherical in form and is abundant on the apple twigs along with the aphid eggs.

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With the *Exclusive Sodium Thiosulfate* feature that puts an "extra wallop" in scab sprays . . . Built especially and exclusively for *apples.* (In addition to scab Apple Dritomic* Sulfur also controls frog eye and mildew.)

For Codling Moth...

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Standard, also Astringent, which has been gaining wide preference due to advantages of Astringent feature. Orchard Brand is foremost among nation's commercial growers' due to "stand-out" performance. (In addition to codling moth Orchard Brand Lead Arsenate controls leaf roller, bud moth, apple maggot, tent caterpillar, canker worm, case bearer, also apple and peach curculio.)

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The *advanced* copper fungicide that has given outstanding performances in spray efficiency and *residual value.* (Ability to adhere longer to fruit and foliage and retain effectiveness.) SprayCop is effective in economical dosages.

Controls scab, blotch and bitter rot on apples; peach leaf curl (in dormant); cherry leaf spot and brown rot; antracnose and leaf spot on strawberries, gooseberries, currants and brambles; black rot, antracnose, downy mildew and dead arm on grapes.

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NEED FOR NATIONAL FRUIT COUNCIL

(Continued from page 11)

Post-War Exports

(Continued from page 11)

each group within itself and then all acting jointly, the resources, and to indicate the strategy that the two government departments, State and Agriculture, which can effectuate world markets for our products, may act aggressively with the assurance that they have behind them informed and unified national fruit and vegetable industries.

Mr. Motz has revealed the favorable possibilities which our former export markets offer. There is also another factor coming into the picture, the like of which we have not enjoyed for nearly a hundred years. It now appears to be our policy to maintain a large merchant marine after the war. Two permanent academies have been established for the training and education of officers of the United States Merchant Marines. These academies are offering a broad four year course with the intent of equipping our ships with the type of officers who can be our commercial ambassadors to the four corners of the world. If the people of America will back up any administration which will foster this type of merchant marines, there lies before industry and agriculture glowing export possibilities. The British maxim has proved sound, that "Trade follows the flag."

If a fruit and vegetable council is needed in the conduct of our external affairs, is it not going to be needed just as emphatically in our domestic affairs?

Apple growers are not strangers to the council idea. Since 1939 they have had a National Planning Committee, in effect a council, consisting of one representative grower from each apple state, which has been an effective advisory link with the Department of Agriculture's programs concerning apples. It should therefore be an easy and logical step for the various commodity interests to develop and perfect representative committees of their own, in such a way that all could be tied together in an over-all council, which would command the recognition and could undertake the responsibilities described by Mr. Motz.

I.A.A. Stands Ready

(Continued from page 11)

ciation represents some of the largest growers' organizations in the United States, as well as the large individual producers. It is a cross section of the industry since it has in its membership every type of distribution agency, domestic, export and import agents in countries located throughout the world. Its statistical records of the movement of exports are published weekly by the governments of the United States and Canada and released in London. It offers facilities unexcelled for participation in the development of world understanding. Its position with the Departments of the Government of the United States, such as the Department of State, Department of Agriculture, Department of Commerce, in the problems attending export and its position in the development of trade agreements, in all of which it has represented the Industry, constitute it one of the prime agencies for operation of any program affecting world trade.

For Free, Voluntary Body

(Continued from page 11)

ment. This trend seems to be an authentic, world-wide tide. We need not be foolish, like King Canute, and try to sweep back this tide. We should, as engineers do, harness the tide to our benefit. So . . . we should be prepared to handle our apples on the new international basis.

2. Citizens of one nation do business with citizens of another nation, and if they fall out, it is among a couple of citizens only. But when governments do the business for the citizens and disagree, that is two nations irritated at each other. Irritations between nations breed wars. All foreign trade is not worth one week's cost of today's world wars, in either money or blood. So . . . governments should stay out of business deals; should avoid all possible sources of irritation between themselves; should stick to proper governmental functions—regulations, only.

3. Business can do many things that government cannot. Done by business as a "business deal" a thing will pass unnoticed which, if done by government will raise a great storm. For government's business is everybody's business, as well as nobody's. We all reserve and exercise the right to kick about our employees, the government. Trading by government becomes, not a business deal, but a matter of getting our rights—and as much more as we can force:—region between region, and nation between nation.

4. It is hugely difficult for any one man, or small group, to speak intelligently and accurately and acceptably for all the many apple belts of the nation. And those citizens and belts that feel injured —and we tend to feel injured under governmentally-imposed controls—will rise wrathfully in all their political power to reject the agreements.

So . . . we should set up the National Fruit Council, because we are moving toward internationalism; but we should build it so that government does not deal with government, but citizens with citizens; and we must make it thoroughly representative and democratic, so that agreements made will be fair enough to all growers and belts to secure voluntary compliance from the growers.

In short, government should have only a final domestic policing power;—nothing else, and that sharply limited. Such a Council must be acceptable on a free, voluntary basis. It cannot be successful if forced by government. And no matter how we restrict and insert guards, this is still the entering wedge for complete government controls. The English like this. Americans do not.

I have an idea that Fred A. Motz joins me in most if not all these considerations; that he favors having the United States Fruit Council set up to conform thereto; and its essential child, the International Fruit Council also.

A.P.S. Offers Services

(Continued from page 11)

prepared to handle wisely and efficiently important war and post-war problems.

A national over-all fruit council truly representing our fruit industry would undoubtedly be capable of going before the Empire Fruits Council or any other international organization to speak for the united fruit interests of America. The value of such a body cannot be over emphasized.

For ninety-six years the work of the American Pomological Society has been devoted to the advancement of the fruit industry. It, therefore, seems logical and proper that this Society should "offer its good services" in this emergency in order

(Continued on page 35)

CODLING MOTH CONTROL

(Continued from page 12)

per 100 gallons. The seventh and last spray contained eight pounds of Mississippi bentonite, one pint of nicotine sulphate and one quart of mineral oil per 100 gallons.

Treatments 2 and 2A are outgrowths of the Ohio Agricultural Experiment Station's research under Dr. C. R. Cutright. The latter schedule has been modified in various ways to best meet the needs of sprays for Southern Indiana. The first cover spray for plot 2 contained three pounds of lead arsenate and ¼ pound of soybean flour per 100 gallons. The second and third applications contained four pounds of lead arsenate, two quarts of mineral oil and ½ pound of soap chips per 100 gallons. The fourth and fifth cover sprays contained three pounds of lead arsenate, two quarts of mineral oil and one pound of zinc sulphate per 100 gallons. The sixth contained one pint of nicotine sulphate, two quarts of mineral oil and one pound of Mississippi bentonite (to emulsify the mineral oil) per 100 gallons. The seventh and last cover spray contained two quarts of mineral oil and ½ pound of Mississippi bentonite (to emulsify the oil) per 100 gallons. The spray treatment for 2A was exactly the same as for treatment 2 except that one pound of lime per 100 gallons of material was added in the fourth and fifth cover sprays.

Treatment 3 is a schedule suggested by the Tobacco By-Products and Chemical Corporation and contained in the first, fifth, sixth, seventh, eighth, ninth, eleventh, twelfth and thirteenth covers three pounds of the commercially prepared fixed nicotine known as Black Leaf 155, while the second, third, and fourth covers contained three pounds of Black Leaf 155 and two quarts of mineral oil per 100 gallons. The tenth cover contained only two pounds of Black Leaf 155 with two quarts of soybean oil per 100 gallons.

Treatment 4 is one developed at the Purdue Entomological Experiment farm and laboratory and contained in the first three sprays three pounds of lead arsenate, two quarts of mineral oil and ½ pound of soap per 100 gallons. The fourth and fifth cover sprays and the top-off following the fifth cover contained five pounds of Wyoming bentonite, two quarts of soybean oil, one pound and 13 ounces of soap chips and one pound of aluminum sulphate per 100 gallons. The sixth and last cover spray contained

(Continued on page 35)

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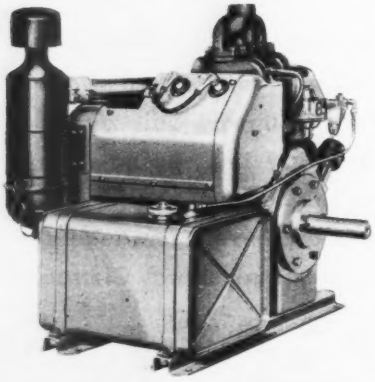

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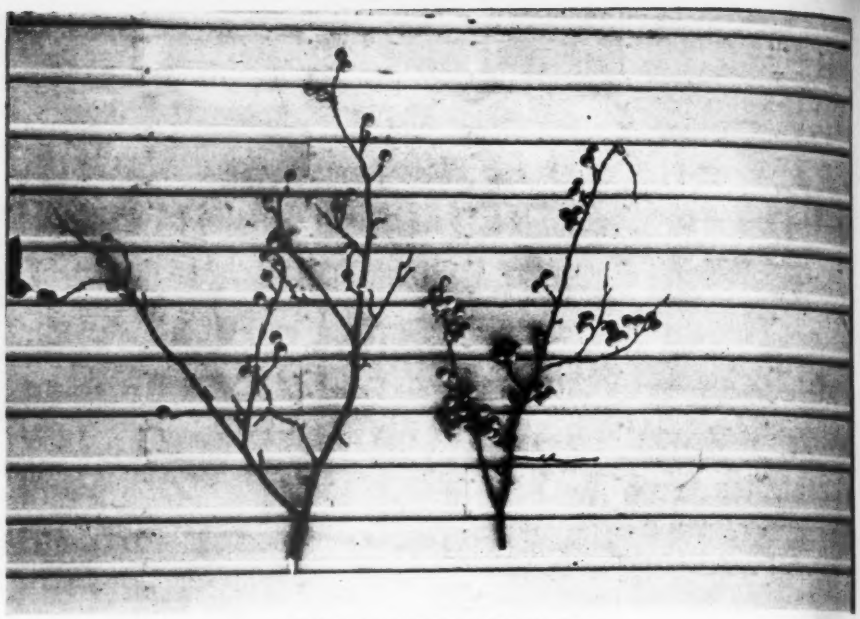

FRUITING WOOD OF DUCHESS

Left: Check, no thinning. Right: Thinned with spray first day full bloom (1 quart toxicant per 100 gallons). Leaves removed to show distribution of fruit.

THINNING WITH A SPRAY RIG

(Continued from page 16)

In so far as the 1942 crop was concerned, the sprayed trees, especially those receiving an application of 1 quart per 100 gallons, were thinned sufficiently by the spray. However neither group of those sprayed trees blossomed in 1943. This may have been due to weather conditions in 1942 (insufficient sunshine) or possibly to the fact that too high a per cent of the spurs fruited even on trees receiving an application of one quart per 100 gallons.

ated with the vigor of the tree and the concentration of the spray. It is questionable if a moderate amount of this injury is very serious from the standpoint of the performance of the tree. The fact that biennial trees thinned at bloom time with the spray have responded with a second consecutive crop seems to mean that the foliage injury caused by the treatment is not as harmful as the reduction in leaf growth caused by the excessive setting of fruit. The injury

TABLE II. Effect of Sodium Salt of Dinitro Cresol Applied at Full Bloom on Fruit Set, Yield, and Size of Baldwin, 1942.

Spray Concentration	*No. Fruits per 100 Blossoming Spurs*	*Per cent bearing spurs with clusters*	*Av. No. Boxes per tree*	*Av. No. fruits per box*
Check	72	27.0	43.2	135
0.125	51	5.0	42.8	99
0.25	35	0.5	47.5	84

One of the most noticeable effects of early thinning with bloom sprays has been the improvement in the quality and quantity of color. This was especially noticeable in the case of Baldwin and Rome Beauty. The fruits on those trees thinned at bloom time developed color over more than two-thirds of the surface, and it was of a bright red type, while fruits on check trees developed not more than number one grade red color of a dull, unattractive shade.

The bloom spray described here results in some injury to the foliage present at the time of application. This should be expected. The amount of injury seems to be closely associ-

seems to be limited to the leaf surface and seldom shows in the tissues of a growing point unless it is a very weak spur. If satisfactory fruit thinning is accomplished, a luxuriant leaf growth will follow and result in the most vigorous appearing bearing trees in the orchard by mid-summer.

In this discussion, tests in rather vigorous orchards have been considered. For trial under most conditions, a concentration of one pint per 100 gallons of water is suggested. It will probably require a quart per 100 gallons to thin Duchess sufficiently,

(Continued on page 36)

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Demand BETTER SPRAYING

No doubt about it, spraying equipment that insures *maximum* yields of *top grade* fruits will pay growers big extra profits in the future. Plan now for those rich markets — and rely on Myers to give you the most dependable construction and efficient performance that can be built into spraying equipment. On every count — whether it's high pressures, big capacities, fast operation, easy handling or utmost economy — you can depend on Myers Silver Cloud Sprayers for continued leadership. Just as this famous line introduced new features and set new standards, it will always reflect the most advanced development in power sprayers.

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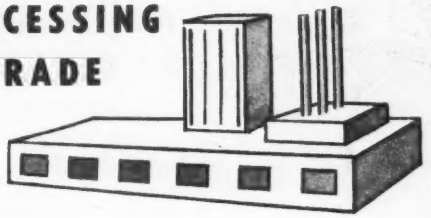
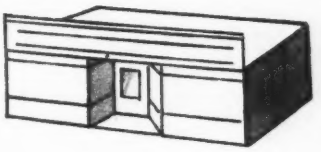
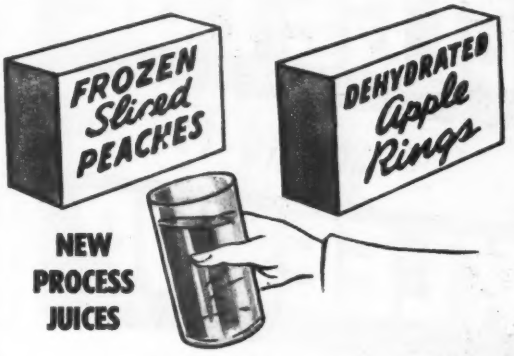
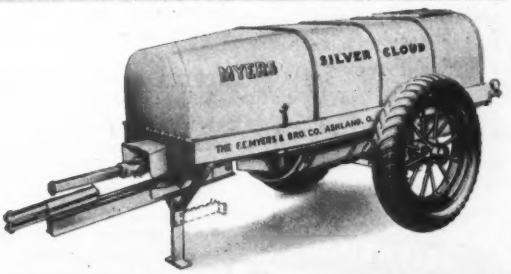


LOCAL TRADE



PERFECT FRUIT will be needed for these big POSTWAR MARKETS





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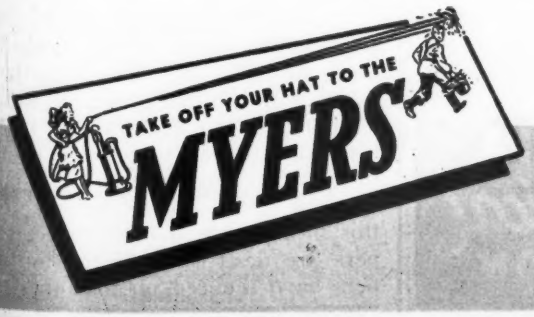

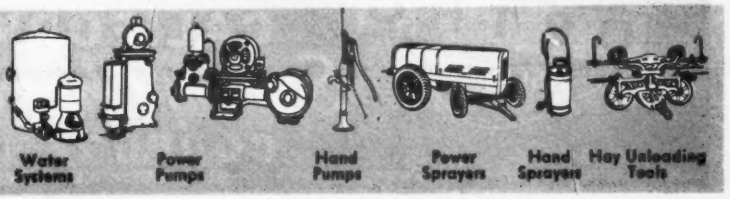

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YOU WOULDN'T WANT TO MOVE INTO A PEST-RIDDEN HOUSE!

You would insist on the house being given a thorough cleaning FIRST. Clean your orchard for the coming crop for the same reason.

The non-caustic dinitro dormant spray containing no oil—ovicidal, and insecticidal. Indicated in control of Bud Moth, Rosy Aphids, Green Aphids and Grain Aphids.

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Control these insects when and where they can best be attacked — in the dormant stage.

SPRAYS FOR THE DORMANT STAGE

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Cleaning the orchard before the growth starts, gives later sprays far better opportunity to do a more effective job.

The dormant oil spray to control Red Mite, Hatching Green Apple Aphids, Grain Aphids, Rosy Apple Aphids, Pear Psylla, Fruit Tree Leaf Roller, Oyster Shell, San Jose, Cottony Peach and Lecanium Scales.

These dormant sprays are effective against the eggs and larvae of some of the most destructive pests that the American fruit grower has to contend with.

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CALIFORNIA Spray-Chemical CORPORATION
ELIZABETH, NEW JERSEY

LEAFHOPPERS

(Continued from page 10)

thetic (food manufacture) capacity of the leaves as shown in the chart in Figure 2. Inasmuch as the ultimate size and color of the apples is almost entirely dependent upon the leaves, it is easy to understand how these insects can affect the crop, not only during the current season, but for the next two or three years.

The apple leafhopper overwinters in the egg stage. The eggs are laid beneath the bark of 3- and 4-year wood in the fall; they hatch into wingless nymphs in the spring around the first of May. These nymphs increase in size rapidly at intervals, or molt periods, leaving the white flimsy "shells" (skins) hanging to the epidermal hairs on the under surface of the leaf. The nymphs are lively animals; it could be said that a football game between two leafhopper nymph teams might well equal in entertainment an Army-Navy football game. Leafhoppers can dart forward, shift to the right, shift to the left, back up and dodge in general about as cleverly as any insect in the orchard, except perhaps, the red bug. This characteristic makes them difficult to hit with spray, since usually they dodge to the leeward side of a branch or leaf when spray is directed at them.

It takes about 23 days from the time the egg hatches until the leafhopper has passed through the nymph stages into the winged adult. The most opportune time to kill leafhoppers with nicotine spray is during the nymph stage in spring before they become adults and lay eggs. For example, the Ohio Station recommends including a nicotine spray at the calyx-cup stage if leafhoppers are likely to be a problem. In other words, if leafhopper injury has been clearly evident in the orchard the previous year, the grower might well plan to use nicotine as the nymphs begin to appear in May the following spring. In fact, one female leafhopper nymph killed early in the growing season will actually result in the "destruction" of thousands of leafhoppers which would have emerged from hers and her descendent's eggs later in the season.

Of course, nicotine can be used later in the season, a few weeks before harvest to help destroy a large population of adult as well as nymph leafhoppers, but a great deal of the leaf damage has been done by this time, and it should be borne in mind that the leaves do not recover from this injury even though the leafhoppers are destroyed. If the leafhoppers have reduced photosynthesis of

the leaf to 20 per cent of normal, as shown in Figure 2, photosynthetic activity of the leaf will remain at this level or drop to a lower level as the season progresses.

The first leaves to be injured by leafhoppers are usually the spur leaves close to the ground. It is apparent that the leafhoppers, if not controlled, will migrate later in the season to the upper portion of an apple tree where light is better.

Generally speaking, leafhoppers cause more injury to grape leaves than the grower realizes. The reduction in photosynthesis of grape leaves due to feeding injury by leafhoppers follows a curve similar to that shown in Figure 2 for apples. These results were obtained in the Ohio State University environment-control chamber by Dr. G. E. Marshall, Dr. H. W. Brody and the writer in 1940-41. It is interesting to note that in case of grape leaves, there is not only a reduction in photosynthesis per unit area of the leaf, but also there is a reduction in the rate of shoot growth and the formation of new leaves. Most grape growers are aware of this fact. It is true that if a large population of leafhoppers is brought under control by use of nicotine in the middle of the growing season, there is rapid new shoot growth immediately following. Leafhopper feeding injury on grape leaves not only reduces photosynthesis and shoot growth, but causes a reduction in the size and number of berries, their color and the amount of sugar. In severe cases of injury a large portion of the foliage becomes gray, then brown and drops early.

The grape leafhopper overwinters in the adult stage among dead leaves and along trashy fence rows. Destruction of these harboring areas, as much as feasible, helps to reduce later trouble. When new grape foliage begins to unfold in spring, and temperatures are warmer, the adult leafhoppers emerge from their harboring places and lay eggs in the young grape leaves, and die shortly afterward. The eggs soon hatch into nymphs which usually begin work on leaves nearest the ground. A nicotine spray at about this time and before winged, egg-laying adults appear, is worth several nicotine sprays applied later in the season after the hoppers have gained considerable headway.

For spray recommendations for both apple and grape leafhoppers, it would be well for the grower to refer to his individual state experiment station recommendations. The active ingredient is usually nicotine as 40 per cent nicotine sulphate, or a powdered material known as Black Leaf 155, the latter of which seems to be showing considerable promise.

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While limitations on manufacture have been relaxed somewhat, there will be nowhere near enough new tractors. If you have a Case you can serve your country and yourself by giving it the little but regular care required to keep it at the peak of performance and make its long life still longer. Take full advantage of your Case dealer's service, but be sure to order renewal parts or arrange for overhaul jobs ahead of time. J. I. Case Co., Racine, Wis.

Above is a Berrien County, Michigan, peach orchard laid out on contour lines to control erosion. Vegetation left in the rows serves the same soil-saving purpose. Contour cultivation saves fuel and increases tractor capacity because there is no hill-climbing under load. The tractor is a Case "DO" with Case Power-Controlled disk harrow that angles and straightens "on-the-go." No stopping or slowing is needed to cross grass strips or drainage-ways without cutting. Ask your Case dealer about this harrow or write for folder.

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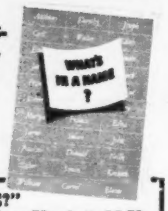

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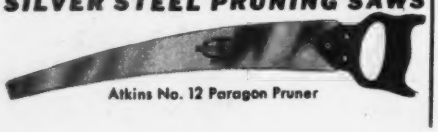

Atkins No. 12 Paragon Pruner

DWARF ROOTSTOCKS

(Continued from page 13)

must keep this sense of balance. Much can be done to promote early fruiting without recourse to dwarfing rootstocks. For example, low heading of trees, little pruning, selection of good nursery stock, attention to orchard site, use of good cultural and fertilizer practices for the young orchard, attention to insect and disease and rodent control, proper selection of varieties, girdling of stubborn trees—these are all well-established practices which favor early fruiting. In fact, there is already a natural shift, which has apparently been overlooked by many, towards the planting of early-fruiting, small-tree varieties, such as Cortland, Rome, and Gallia Beauty. And this trend may well continue and may become an important consideration in the appraisal of new varieties. Fruit breeding programs may be expected to consider these factors in the production of new varieties for the future.

Sole reliance need not necessarily, therefore, be placed upon dwarfing rootstocks. Nevertheless, there is considerable promise in the use of rootstocks, particularly the so-called "Malling" rootstocks, and it is because of the promise and the interest which has been attached to them that this report—in the nature of a report of progress—is made.

First of all, the designation "Malling" is derived from the East Malling Research Station in England, the place where the more common rootstock materials for the apple were freed from mixtures, standardized into 16 types, and designated by number as "Malling I", "Malling II", etc. Most of them are relatively old as plant materials go, but their standardization and introduction as material which can be relied upon has attracted attention to them as "new". Some of them produce fruit trees which are no larger than a man is tall; others produce trees which are scarcely dwarfed at all; others show intermediate degrees of dwarfing. Some are more precocious in fruiting than others; some outyield others; and some show adaptation to different soils and climatic conditions—a feature which some day may prove to be the most important of all.

Now, the word "dwarf" means many things to many people. To some it means a very small or diminutive tree produced by working upon a dwarfing rootstock. To others it means a tree which is smaller than the standard by whatever means the smaller stature is attained. To others it means a tree which is produced by working the scion variety upon a

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clonal rootstock, and to others it undoubtedly implies variations of those meanings or new ones altogether. And so a discussion of dwarf fruit trees, in the sense that the topic is in the minds of many fruit growers today, takes on a very broad meaning and must be carefully thought out in order to remove any confusion in thinking and to strip it of any unwarranted hopes or expectations.

Arranged with reference to the size of tree which they in general produce, the more promising of the Malling rootstocks as judged at present, from experiences at the N.Y. State Agricultural Experiment Station at Geneva, N.Y., may be listed as follows:

Malling IX (Jaune de Metz)

Selected as a chance seedling in France about 1879; roots snap and break easily; makes very dwarf tree, seldom taller than a man; can be planted 6 to 10 feet apart; fruits very early, first or second year planted; shallow rooted, likely to lean unless headed quite low or staked; easily broken; trees have yielded as much as 1 to 1½ bushels of fruit; Early McIntosh, Rhode Island Greening, Grimes Golden, Jonathan, Cox Orange, Baldwin, Turley, and Northern Spy have done very well on this rootstock, whereas Winesap, Wolf River, and Gallia have not done so well; valued as a garden plant and recommended for that purpose.

Malling VII

Long known in English nurseries as a mixture in Doucin stock; makes dwarf tree, but larger than Malling IX; shallow rooted; early fruiting, third year set; has done well for McIntosh, desirable where a more substantial small, early-bearing tree is desired than is produced on Malling IX; useful for varieties which are too severely dwarfed by Malling IX; promising.

Malling IV

Holstein Doucin, or Dutch Doucin; common in Holland and Germany; makes semi-dwarf tree with most varieties; smaller than Malling I but larger than Malling IX and Malling VII; shallow-rooted; young trees not overly-well anchored; early fruiting, third or fourth year; may have a place but needs further testing; promising.

Malling V

Doucin Ameliore, also called Improved Doucin in English nurseries and Red Paradise in Dutch and German nurseries; a common stock in Europe, superseding Malling II in some places; makes semi-dwarf tree, smaller than Malling I with most varieties; good nursery plant and likely to be well-considered for that reason alone; needs further trial.

Malling II

Doucin, of the best French nurseries, often called English Paradise; makes semi-dwarf tree, slightly smaller than Malling I, but not with all varieties; does not propagate readily in the nursery and so likely to be discriminated against for that reason; well-liked in Europe; needs further testing; promising.

Malling I

Broad-leaved English Paradise (of Rivers); of English origin, selected by T. Rivers as a chance seedling in 1860; makes

(Continued on page 32)

Cal Johnson "Banded"

HIS NEIGHBOR TOOK A CHANCE

Infestations of caterpillars, cankerworms, basket or bagworms and the foliage and bud-devouring larvae of other tree-climbing insects occur in unexpected places. Cal Johnson knew it, and even though no infestation had occurred in his neighborhood for some time, yet each year he took the simple and relatively inexpensive precaution of insuring his crop against the ravages of these insects by banding his trees and vines with genuine TREE TANGLEFOOT — the one barrier that no climbing insect can pass. Last year it meant the difference between a bumper crop at high prices and a tremendous loss. The TREE TANGLEFOOT he had used was literally worth its weight in gold!

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"I'll be back Trapping Muskrats in Diamond's Pond"

He may be in Ireland . . . or Australia . . . or the South Pacific. But his thoughts are never far from home.

And when he writes, he asks about the small familiar pleasures that he left behind . . . trapping muskrats when the ice breaks . . . fetching cider from the old mill . . . just relaxing in a well-worn chair before the fire.

These are the little things that to a soldier—as to all of us—add up to "home." These are the simple pleasures he looks forward to returning to.

It happens that to many these small pleasures may include a glass of beer occasionally—as a beverage of moderation after a hard day's work . . . enjoyed with friends or with a home-cooked meal.

A glass of beer—not of crucial importance, surely . . . yet it is little things like this that help mean home to all of us, that do so much to build morale—ours and his.

BREWING INDUSTRY FOUNDATION

Morale is a lot of little things

DWARF ROOTSTOCKS

(Continued from page 31)

semi-dwarf tree, well anchored, vigorous and substantial, some suggestion of collar rot with some varieties, as Cortland; McIntosh seems especially well suited to this rootstock, yielding ¼ bushel of fruit as 2-year-old orchard tree, ½ bushel as 3-year-old tree, and 1½ bushels as 4-year-old tree; precocious fruiter with most varieties; being watched with great interest as possible commercial semi-dwarf tree, planted 15 x 20 or 20 x 20.

Malling XIII

Selected and named Doucin U.2 by Spath, Berlin; makes semi-standard tree, smaller than Malling XII yet larger than Malling I with most varieties; not as early fruiting as Malling I; does well on heavy soils; makes an exceedingly attractive tree with Cortland; promising for some conditions.

Malling XVI

Selected and named Doucin U.3 by Spath, Berlin, also called Ketziner's Ideal; makes strong, well-anchored semi-standard tree; considered by many as producing a full standard tree but has proved smaller than standard and than Malling XII at Geneva, New York; very promising for uniform, sturdy, well-anchored tree slightly smaller than standard.

Malling XII

Selected as a seedling from Crab stock at East Malling, England; makes standard tree; roots tough, spreading, and deeply penetrating, quite unlike most of the other Malling types; gives uniformity to standard tree; promising.

To generalize further, Malling rootstocks have been outstanding in their performance at Geneva, in Western New York. In the propagation beds they have behaved much as they do in England—so much so that visitors from abroad have remarked upon their seeming "at home" under the conditions provided. They have produced a good yield of well-rooted rootstock material. They have taken hold in the nursery as well as, or better than, any common lining-out stock used for the apple. They have shown no incompatibilities among 210 combinations including 38 varieties and 14 rootstocks. They have produced a high stand of excellent budded trees for orchard planting. They have transplanted to the orchard better and with lower mortality than common nursery stock. As young orchard trees—planted mostly 1935 to 1938—they have shown splendid uniformity and excellent vigor and growth in the orchard and have seemed generally "at home" under a system of sod-mulch plus commercial nitrogen. They have withstood a short period of –31 degrees F during the winter of 1933-34 at Geneva, New York and a minimum temperatures of –38 degrees F on a light soil in the Hudson River Valley in 1942-43. They did not suffer appreciably during the severe drouth of 1934 and 1936. How they

will behave as the trees get older, what insect or disease or other unforeseen troubles may appear to upset calculations, or how they may perform in other sections and under other conditions are yet to be determined. So far, the record is good, but, as with most new things, it is well to make haste slowly. It so happens that nursery supplies of both rootstocks and trees on these rootstocks are so limited that there is very little chance for anyone to "plunge".

Unfortunately, in so brief a presentation, it has been necessary to generalize rather too freely. It cannot be emphasized too strongly that while the general statements that have been made will hold for the most part, yet each stock-scion combination has its individuality. Thus, the Malling IX rootstock generally produces a very small tree, whereas the Malling I rootstock produces a semi-dwarf tree; yet the vigorous Northern Spy on the very dwarfing Malling IX rootstock may develop into a taller tree than the weaker-growing Gallia on the semi-dwarfing Malling I rootstock. Also, as has been indicated, certain combinations seem especially happy and successful, whereas others seem less desirable. Thus Cortland/Malling XIII, McIntosh/Malling I, and Red Spy/Malling I have appeared highly desirable orchard combinations; whereas Cortland/Malling I has suffered from a collar rot difficulty. Accordingly the "scion concept" (using a word coined by Dr. H. J. Webber of Riverside, California, to represent a plant which is the result of a union between a stock and a scion) should be thoroughly recognized, and in the final analysis each stock-scion combination must be carefully analyzed for the many small factors which make for success or failure in any orchard performance.

Finally, it is doubtful that the Malling rootstocks represent the last word in improved rootstocks for the apple in America. History has shown that in the progress and development of horticulture in America, success has often been attained by a fusing or blending of materials from the Old World with native materials from the New. Already there are some promising rootstock materials which have been produced by the United States Department of Agriculture, and which warrant further attention. Also, there are hardy rootstock materials from Canada, including forms of *Malus robusta* and *Malus baccata*.

There is a great deal to be learned in the entire field of rootstocks for fruit trees. The present interest in dwarf trees bids well to further its accumulation.

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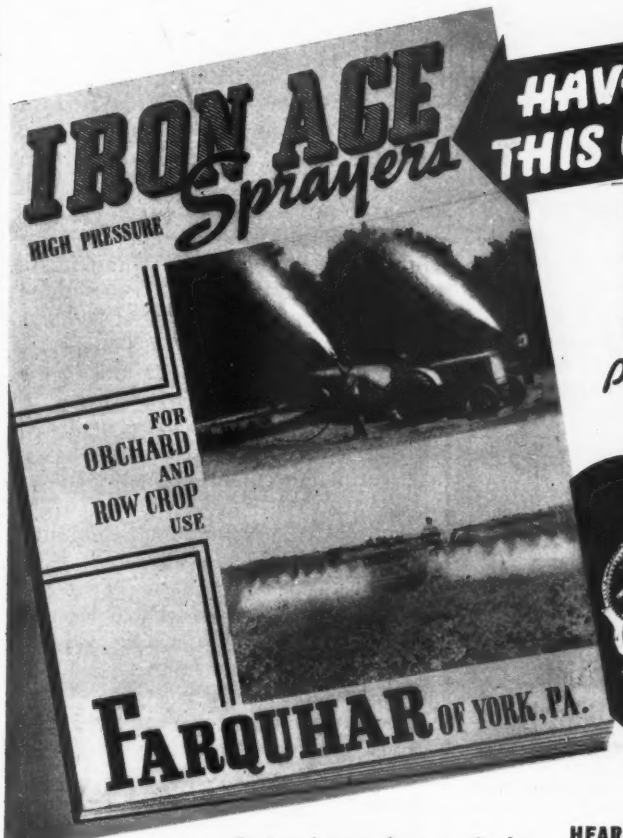

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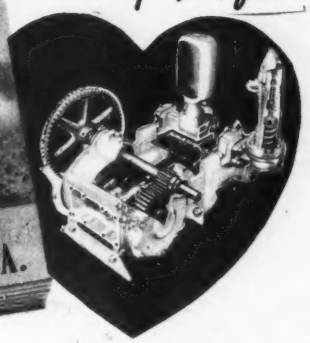

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RODENT CONTROL

(Continued from page 18)

of these checks, there is danger that in years favorable for their increase these animals may inflict serious injuries to fruit trees in orchards and nurseries.

Snowshoe rabbits, or varying hares, are larger than cottontail rabbits, averaging 3 to 5 pounds in weight. They have longer legs and their large, broad hind feet are heavily furred between the toes, making it easier for them to travel on top of the snow; hence the name "snowshoe." These animals are also called "varying hares" because of their seasonal color changes, due to complete molting—brownish in summer and white in winter.

Hares inhabit different types of forest cover, varying with their geographic location and with the season of the year. Mature woodlands of any type seem to be frequented less than younger and shrubby growths, which provide both food and cover. Because they are usually found in mixed softwood-hardwood swamps throughout the year, snowshoe hares are sometimes called "swampers."

These hares live largely on succulent vegetation in the summer and upon twigs, buds, and bark of various trees and shrubs during the winter. Where fruit orchards are located near large swamps or habitats favorable to hares, damage is usually done to the stems and branches of young trees and the lower branches of older trees.

Snowshoe hares are not as prolific as cottontails. They breed one or more times during the summer and produce usually 3 or 4 young to the litter. As far as can be determined, the gestation period is about 36 days. Unlike cottontails, young hares are born with heavy long fur and in less than 24 hours after birth are able to hop about. The young are deposited in "forms." Although they are capable of eating succulent plants in a few days after birth, the mother suckles them until they are about 2 months old. The male hare plays no part in rearing the young.

It is well known that snowshoe hares are subject to periodic cycles of great abundance and almost complete disappearance. Moreover, this variation in abundance in northern regions influences the numbers of their predatory enemies. The great horned owl, wildcat, fox, and, at times other species, prey on hares in the Eastern United States and take a heavy toll. These carnivorous birds and mammals should be encouraged near fruit orchards, providing they do not conflict with other economic interests. However, these predators usually are never numerous enough to control great numbers of rabbits and hares, so various more aggressive control methods may have to be used.

Complete extermination or wholesale destruction of rabbits and hares is neither desirable nor feasible. From the point of view of wise conservation, these animals should be reduced in numbers only to insure comparative safety to crops.

Hunting with a shotgun during legalized seasons is one of the most effective ways of keeping down the numbers of rabbits and hares in areas where they are destructive. Cottontails may be hunted without a dog, as they are jumped easily, but a beagle or other hound is needed usually to take hares, although sometimes one may closely approach a "form" before the animal thumps and bounds off. Hunting must be repeated in an infested area a number of times, as other rabbits may migrate into it.

Cottontail rabbits and hares are easily trapped but this method is slow and, during closed seasons, is also subject to restrictions in the game laws of some States. However, with a number of traps and persistence, one may reduce the animals to the point where little damage is sustained. The oldfashioned box trap, set with a figure-4 trigger with cord attached, is effective, but less efficient than the Wellhouse trap. Information on how to construct this type of trap will be furnished upon request of the Fish and Wildlife Service.

Box traps for cottontail rabbits should be set near brush or briar patches, stone walls, active burrows, or where there is an area of mixed plant growth frequented by rabbits; and also among orchard trees where they may be feeding. If traps are set in fairly open places, they should be covered lightly with a little brush or orchard prunings as an attraction.

(To be continued in an early issue)

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CODLING MOTH CONTROL

(Continued from page 24)

two quarts of mineral oil and ½ pound of Mississippi bentonite (to emulsify the oil) per 100 gallons.

Bait trap records were used for timing the sprays except for treatment 3 in which case a strict seven day schedule of application was maintained. Even here, however, bait trap records were referred to, to determine into which applications mineral oil was to be put to increase the kill of eggs. If effective control of the codling moth is to be obtained bait trap records become more indispensable as the number of sprays applied during the season are reduced. It may be said of each of these programs that they controlled the codling moth satisfactorily without considerable fruit and foliage injury even though the attack was heavy. The very fact that we are able to make this statement this year is evidence that we now have several programs using lead-arsenate and at least two or three containing no lead-arsenate which controlled the heaviest infestations of the codling moth under Indiana conditions.

NATIONAL FRUIT COUNCIL

(Continued from page 24)

that the proper procedure may be taken to assist, protect and further all the fruit interests of our country.

Therefore, if it is the desire of the fruit industry of the nation generally, the American Pomological Society will undertake the job of calling together at a fairly early date delegates of all the organized fruit interests of the country, in order that the will of the majority may be effectively and properly expressed on the pending problems.

Closer Unity Needed

(Continued from page 11)

body. It has been further suggested that the American Pomological Society could call together representatives of the various states and the various groups of fruit interests in an endeavor to establish and make effective such a representative national fruit association. It seems to me much good could come from such a meeting, and I am sure that the American Pomological Society would be glad to use its influence and take the initiative in calling the meeting.

Advisory Council Urged

(Continued from page 11)

fruit industries.

So far as apples are concerned, because of the National Apple Planning Committee's close relationship with the various regional Apple Institutes, who in turn represent the masses of the regional apple growers, this Committee could delegate a national representative of all of the apple growers in the United States to a National Advisory Fruit Council.

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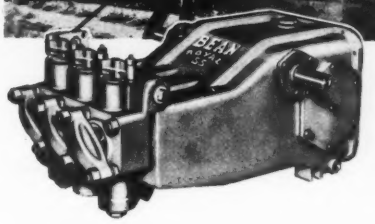

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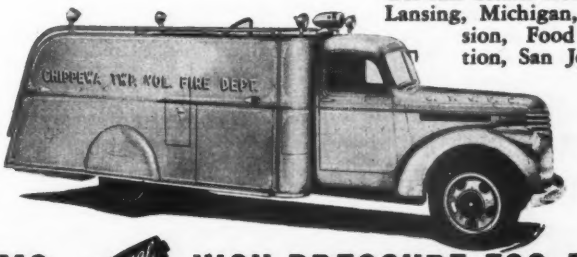

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Thinning With Spray Rig

(Continued from page 26)

as well as very vigorous trees of Transparent, Early McIntosh, Wealthy and Baldwin. One and one-half pints per 100 gallons has resulted in satisfactory thinning of Wealthy trees of moderate vigor. In one case a concentration of ¾ of a pint per 100 gallons proved adequate for Rome Beauty and Golden Delicious. Unquestionably, vigor has much to do with the results and should govern the concentration. The spray should not be used on very weak trees or those not fertilized in previous years.

Different results are likely to be obtained with different varieties. Northwestern Greening seems very susceptible to the toxic properties of the spray. A concentration of 1 pint per 100 gallons applied the first day of full bloom removed practically the entire crop from rather vigorous trees of Northwestern Greening. The practice is in the experimental stage and it will be well to limit trials to Transparent, Early McIntosh, Duchess, Wealthy, Baldwin, Golden Delicious and Rome Beauty until more is known about the response of other varieties.

The spraying should be thorough enough to cover every flower. Applied at the right time, it will not prevent fruit setting by the center flowers of the more vigorous spurs but all lateral flowers must be hit to destroy them. One of the most common mistakes made by growers using the spray for the first time is the tendency to spray very lightly. There seems to be a fear of killing all flowers. If

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the trees are of the right kind to receive the treatments, they will stand thorough spraying and this will be needed for sufficient thinning. Spraying from the tank has proved quite satisfactory since all flowers are in an upright position.

Where mature trees are beginning to crowd in the orchard, the low limbs are of course less vigorous than those in the upper two-thirds of the tree. Uniform spraying of closely planted trees is likely to thin the crop too severely on the low limbs. This has been experienced in closely planted orchards of both Wealthy and Rome Beauty. Under such circumstances it will be the safer practice to ride the rig and spray the top two-thirds normally and skimp on the low limbs which can be hand thinned later from the ground if they need it.

The toxicant as obtained is a supersaturated solution in gallon cans. For this reason most of the active ingredient has settled at the bottom of the container. It is highly important to stir the contents of the can thoroughly and pour it from one container to another several times so that the fraction taken is entirely representative of the contents of the original container. It will be found more convenient and accurate to make a stock solution by mixing one gallon of the toxicant with seven gallons of water. One gallon of this stock solution would then be equivalent to exactly 1 pint of the original product.

The bloom spray will seldom result in as uniform distribution of fruit as hand thinning. However, it has been used on numerous adapted blocks to produce crops of good commercial size and quality which would have been impossible without employing considerable labor for hand thinning. The practice also has the advantage of accomplishing a very early thinning over the entire block.

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APS

A PAGE CONDUCTED IN THE INTERESTS OF THE AMERICAN POMOLOGICAL SOCIETY

Post-War Planning

YOUR secretary has attended many horticultural meetings. None were more profitable and instructive than the Central States Horticultural Conference held in joint session with the American Pomological Society at St. Louis, December 13-15. President T. J. Talbert, Columbia, Missouri, spoke with clarity and vision in his address entitled "In Time of War." This timely and inspiring message will, I am sure, be of general interest. The following is quoted in part from President Talbert's address:

"Certainly the group here to participate in the conferences and discussions this morning represent a very accurate cross-section of the leadership of the fruit industry of the Central States Region. To have such a splendid attendance from so great a section of the country can represent only one thing—a keen and ardent desire to produce efficiently and effectively to the limit in order that the home fronts and fighting fronts may be adequately fed and nourished.

"The fresh fruit industry's first consideration in time of war is to keep our people at home, our Armed Forces and our Allies supplied with adequate quantities of vitamin-rich fruits. It is obvious and of paramount importance that the closest cooperation and understanding between growers and distributors be established and maintained.

"Furthermore, in accomplishing today's task a harmonious working agreement between growers and distributors and the maintenance of grade standards, as far as it is consistent under the war effort, is needed. Additional economies and efficiencies in distribution require emphasis. A careful consideration of these factors and others will aid in laying the ground work for a bigger and better fruit market when peace has been won.

"There was a time not so many years ago when apples in many homes were considered mainly a holiday speciality. They were sold for a few weeks after harvest, and the fruit then disappeared or became comparatively scarce on the markets. Today, however, apple consumption and sales are continuous throughout the year. We cannot stop with this progress, because there are still greater opportunities for apples. The annual per capita consumption should be increased materially. We must develop and meet the various uses and needs of our product so that all may profit alike. This is true because better health for consumers will be assured and increased demands upon both producers and handlers is sure to follow.

"In these times we hear much talk about post-war planning, or what shall we do and what will happen after the war is over. In most talks and articles written upon this subject, much theory is given, high sounding terms or words are used, and when the whole is considered, little of practical value to the average producer has been presented.

"It seems, therefore, that every fruit producer should give this problem of handling his affairs and earning a living after the war careful consideration. Perhaps the only rational procedure is to consider what will happen on the basis of what has happened before, after similar wars, taking into account, of course, the matter of change and development. The study will show, it is believed, that almost invariably depression periods have developed or followed such conflicts within a few years. During such times, it has been difficult for producers generally to make ends meet, and the years have been trying and discouraging ones for all.

"The most important job now, of course, is to win in this struggle and in the peace to follow. All of our efforts should be directed toward this end even if it requires the loss of profits, and also even if the worker barely makes a living or is able only to clothe, feed and educate his family. Perhaps this, in many instances, is all that can be expected under such conditions as prevail.

"It is the critical moment that tests the successful fruit grower. Now that the crisis is upon us, remember that we are fighting ruthless and powerful enemies. In some instances no quarter is given. 'To what end?' you may ask. That you may prove the victor in war and peace. Yet without toil and sweat this may not be.

"On the football field, individual performance is valuable and spectacular. However, it is the well trained, alert, fast moving team, working together smoothly as a unit that wins the most games.

"The American Pomological Society offers unexcelled teamwork and co-ordination by constant contact across the country with the forces and personalities that count for the most. The organization is skilled and experienced in helping both state and national fruit growers' societies in serving their memberships quickly and thoroughly.

"With such overwhelming and momentous problems as confront us today, never was there a time when an independent and united voice for the fruit industry of the nation more essential and important. Horticultural societies, local and state, should recognize this and take an active and leading part in shaping and determining what that voice shall say.

"Certainly some of the major topics and questions to be considered and thoroughly discussed are crop goals and controls; price ceilings and supports; labor; equipment and supplies. What are the factors that have hampered production and distribution? Can anything be done about the matter? How shall we proceed? Thinking, planning and acting cannot be called Utopias but efforts like these are practical and all we have to employ to procure the results desired.

"Producers do not need 'pep talks'. Neither do they want impractical, idealistic, long drawn out, time consuming plans and regulations. They are asking for enough 'green light' to produce, harvest and package the foods required for victory.

"We have adjusted our thinking from surpluses to the urgent need for more and more production. It is also realized that this need may continue considerably beyond the close of the war. We gladly accept our responsibility. It is our chance to render the greatest service ever."

H. L. Lantz
SECRETARY

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—who have used **ALL 3** of the leading makes

"There is no possible comparison between the upkeep cost of the 'Friend' and other sprayers, because the 'Friend' cost is so much lower. Our repair expense this season is zero, after spraying 270,000 gallons, 120 acres of apples. The dependability of the 'Friend' is perfect."—*H. L. Macomber, Troy, Kansas.*

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For Dependability, the "Friend's" record is best. Its pump has only 1/2 to 1/3 as many moving parts, which makes a big saving in repair expense and spraying time. All working parts are completely lubricated; many owners have used the same plungers and packing for 5 years.

For Steady High Pressure, the "Friend's" record is best. You never need spray with a leaky pump—the packing is adjusted instantly from the outside. Valves and pressure controller also are outside, for instant cleaning.

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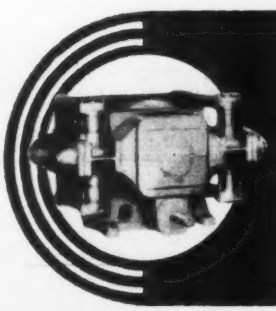

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